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What do You Think?

THE future of the British Industries Fair is a matter in which the electrical industry is very closely interested. Can any new measures be taken to compel the event to increase our electrical export trade?

What is to happen in 1932 does not call for discussion now—that is all settled, and things will probably work out very much as they did last February. But the setting up of the Garnsey Committee to formulate definite plans for providing permanent accommodation for the London Section takes one far beyond the year 1932 and has suggested to some minds that the electrical industry might well re-examine its whole attitude toward the Fair.

We shall all do well to abandon exaggeration of points of secondary importance; forget what have seemed to be personal predilections concerning details; and concentrate on main points, taking as long a view as possible.

Let us state the position of affairs as we find it to-day.

The Fair was started in 1915 to demonstrate to our own people and to buyers from overseas what progress was being made by British factories, under the protected conditions of war-time, in producing goods for which we had become too dependent upon foreign competitors. At first, electrical goods were not included, because there was not room for them. At a later stage they were added; the Fair grew year by year; the London end changed its quarters again and again, having no settled home; the Birmingham Section had vast space available and has gone on extending; part of the electrical exhibits (radio, scientific instruments, glassware, &c.) are now under the London wing, while the great bulk of them find their way to Birmingham.

The enterprise of the Birmingham Chamber of Commerce has always had our complete admiration. No praise would be too high for the enthusiasm with which this body of men has stood by the movement; and only good can be said of the little circle of electrical men who have given unstinting service to our particular section. Are there reasons for raising the question of the desirability of change? Some leading men amongst us incline to think that there are. What change do they suggest?

Let us frankly say that we ourselves are not satisfied with the committee arrangements. It has been said that the burden has fallen to one or two overworked "willing horses," instead of the section being run by a larger working body of men. Is this view widely held? If so, how can improvement be effected?

The Chelmsford Committee strongly held that Birmingham should continue to accommodate the *heavy industries*. Do the electrical exhibits that we are in the habit of seeing at Castle Bromwich legitimately come under that description? Or do the smaller classes of products—the kind suitable for a short sharp market trade—predominate? Birmingham has ample room for future extensions, but London is seeking a new and permanent home. The Garnsey Committee has to find a site "easily accessible from Central London" whereon buildings can be erected capable of extension as required; here for the years to come there will be a

" great national enterprise," a " national Trade Fair."

We must remember that the Birmingham Electrical Committee, in its evidence before the Chelmsford Committee, recommended that Trade Associations might be invited, or encouraged, to undertake the organisation of the Section dealing with their own particular industry.

Now for the purpose of inviting readers profitably to express their views in our columns, let us sum the matter up.

The prime object of the Fair is to bring overseas buyers to see our products; it is complained by many that they come to London, but do not travel on to Castle Bromwich. The electrical exhibits are " in two places at once "—would London provide a better marketing centre for *everything* electrical than Birmingham does? The Electrical Committee must be strengthened—co-operation of Trade Associations has been suggested. On paper there has been such—can we have it in actual fact? The Electrical Section has always benefitted the Home trade, but the chief end of the Fair is to serve the export trade and to draw the overseas man!

The Voice of Industry

THIS has been a week of much industrial speaking. In reviewing the situation at a City meeting, SIR GEORGE A. TOUCHE, Bart., referred to the merciless taxation which was denuding British industry of resources needed for its maintenance and development. He gave depressing statistics of the falls in various classes of shares during the past two years, but it was noteworthy that he quoted electric light and power securities as the only class which showed a material rise over the period. Here, he said, " the undeveloped field is still great enough to counteract any business reaction." SIR MALCOLM FRASER, at another meeting, likewise mentioned the severity of the taxation handicap upon British manufacturing, and declared that for every £100 paid in taxes here, only £64 was paid in France, and still less, £50, in Germany! At a third function toward the end of last week, a well-known electrical man, SIR DUNCAN WATSON, a member of the Central Board, protested that in this country we were burdened by " three times " the taxation of other countries, and were absorbing capital which should be free for industrial development. SIR FELIX POLE found one of the most hopeful signs in the fact that the nation was " thinking hard," but he proceeded to urge thinking quickly regarding the Weir railway electrification proposals. Other industrial speeches were delivered at the meeting of the National Council of Industry and Commerce, stressing the unwillingness of manufacturers to extend their plants if their operations were to be subject to the fluctuating policies of politicians. Where there is no certainty the spirit of enterprise cannot flourish.

Siemens's Success

AMONG the industrial enterprises which are weathering the economic storm is SIEMENS BROS. & CO., LTD., whose jubilee meeting was held last week. Lord Queenborough's speech was encouraging. He said that although orders for submarine telegraph and underground telephone cables were not so large as could have been desired, in the other branches of the business activity was well sustained. There was actually an increase in orders from overseas, although the prices obtained were unremunerative; a good deal of automatic telephone plant has been supplied to customers in all parts of the world. It is particularly good to know that British capital is still being profitably invested abroad. During the year, Siemens Bros. joined with other concerns in the purchase of a South American telephone system, from which orders for British plant will come.

Summer Opportunities

IN the majority of British homes the coal fire still holds sway. While this may be satisfactory enough to the housewife in winter, in spite of the labour, dust, and ashes involved, when summer comes such advantages as it possesses are neutralised by its unwanted heat. Then, although hot kitchens may lead to the purchase of electric fans, a wider horizon breaks for the sellers of electricity and electrical appliances. It is at this time of the year that the electric cooker stands forth as the only tolerable means of providing hot meals; the electric kettle supplants the traditional kettle on the hob; and the electric water heater displaces the kitchen boiler. Now, the unprepared begin to look to the electrical contractor for the necessary wiring and equipment to enable them to use these appliances, and, in short, it is the time of year when business for several branches of the industry should be at its best. If supply authorities, contractors, and retailers do not make a special effort now they will lose opportunities which may not recur for another twelve months.

A Level Start

SOME indication of what would have been the relative positions of electricity and gas had the two industries come into being simultaneously may be found in future developments in Welwyn Garden City, which has grown in a few years from nothing to a self-contained town. At the present time all the inhabitants use electricity in some form or other, and nearly half cook by its means. This does not imply that the merits of the two for cooking are equal, since the scales are still heavily weighted against electricity by the fact that the householders have used gas for the purpose for the greater part of their lives. Nevertheless the electrical proportion is increasing every month, and we believe that with the growing up of a generation accustomed to the " all-electric " idéa (coupled with the progressive policy adopted by Mr. A. T. Bullen, the chief engineer) the time is not distant when the percentage of consumers for cooking will approximate to that for other uses.

Radio-Telephony

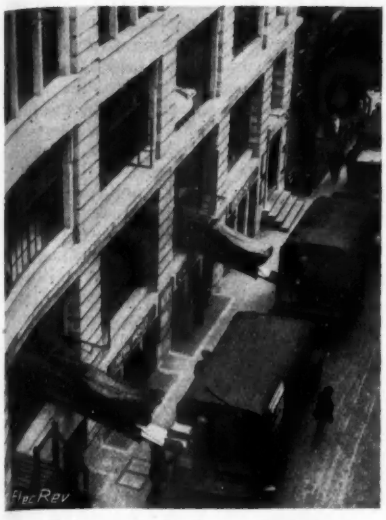
THE single side-band system of radio-telephony was first applied some years ago now to carrier communication over wire lines, its chief advantage in this instance being the material one that twice as many speech channels can be accommodated within the same total band width as when using both side bands and direct modulation. The method has since been applied to long-wave telephony with considerable success; indeed, it is not easy to appreciate how the London—New York trans-atlantic circuit could be operated commercially without it. With growing congestion of the ether the halving of the band width has assumed major importance, especially as the suppression of the carrier wave and one side band has the additional merit of increasing efficiency and, more particularly in the case of high-power plant, of reducing the power expended. Thus the several advantages of the single side-band system may be regarded as equivalent in the aggregate to the provision of at least equal, if not better, average service by means of a smaller transmitter; that is to say, ultimately smaller capital, operating, and maintenance costs, the reduction of which is one of the primary aims of all commercial enterprise. Hitherto the method has not been applicable to short-wave telephony, chiefly on account of the difficulty of synchronising the transmitting and receiving ends adequately, in view of the fact that at the high frequency involved the accuracy needed must be of the order of one in a million. This obstacle has, however, now been overcome as is explained elsewhere in this issue.

Use the Higher Pressure

IS it altogether good practice to operate cables—in some cases for several years—at lower pressures than those for which the cables are designed, in anticipation of schemes in mind or designed for operation at the higher pressures in the future? To look ahead, of course, is highly creditable, but in some cases, where many miles of cable are involved, it seems that a better case might be made by taking full advantage immediately of the higher-pressure transmission which the cable will permit. A decision in any instance would necessitate consideration of the additional cost of step-up and -down transforming equipment, &c., but by a careful choice of transformer capacities, ratios, tappings, &c., this item might easily be wiped off as an "extra"—transformers are adaptable.

The Power behind the Press

Impressions of the machinery installation in one of the largest and most modern weekly newspaper offices



Telescopic Delivery Chutes

A TRITE phrase—the power behind the press—but a descriptive literalism in this case, since the convenience of application of electric power, aided by the facility of distant selective and co-ordinative control by push-button automatic gear, alone makes it possible to print nearly four million copies of the *News of the World* within about nine hours.

The machine room accommodates 66 eight-page rotary printing press units of Crabtree make, fed from below by 66 paper-roll stands, the whole being driven electrically by 22 double-motor 125-h.p. equipments having special control features, the lay-out providing for the future addition of a sixth line of 15 units. At present four and a-half lines have been installed, made up of one 6-unit and four 15-unit lines, representing a printing capacity of twenty-two 24-page, or thirty 16-page, papers at the rate of 1,116,000 copies per hour.

In addition there is a stand-by plant in adjacent premises (ten 16-page presses) and also at Belle Isle, King's Cross (thirteen 16-page presses). The total installed horse power aggregates 6,192 h.p., made up of 372 electric motors ranging in size from 0.5 to 125 h.p.

Direct current is purchased at 410 volts from the Charing Cross E.S. Co., Ltd., and a stand-by supply from the City of London E.L. Co., Ltd. This stand-by is used once every quarter to ensure that it is in service order. Two intake chambers have been provided at the south and north-east corners of the new building, respectively, of 4,000 amperes capacity; they can be so cross-connected as to minimise the possibility of supply interruption. The main J. H. Holmes switchboard in each chamber is divided for power, lighting, and heating circuits, each section being separately metered (in addition to night and day service differentiation) with change-over switchgear to enable supply to be taken from either company's mains. A feature of the main 3-pole change-over switchgear is a mechanical interlocking arrangement (specially specified in preference to an electrical system) that prevents the load being broken at the knife switches; a 0.25-in. movement of the links or switch blades trips two 4,000-A Statter circuit breakers placed overhead.

From these main boards service cables are run to the press control panels, 12 of which are situated on the south gallery, which is 160 ft. long, and 10 on the north-east gallery at the two extreme ends of the machine room, behind glazed-teak enclosures to exclude dust, paper fluff, ink and oil spray, and ventilated by fans and ducts. The selector gear on these boards permits of making up any combination on a 15-unit line of presses to any one of the five driving equipments. The back view of the panels shows the neatness of the wiring; the main resistance banks are supported overhead for accessibility, adjacent cables having heat-resisting asbestos coverings.

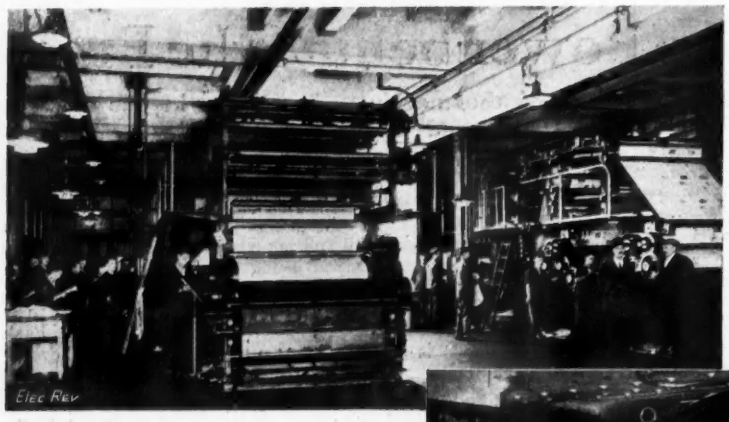
Multi-coloured pilot wiring has been used throughout of B.I.C. manufacture and the colours have been adhered to continuously on the external wiring between the control switchboard panels and the master-control boxes at the machine folder stations. All wiring has been drawn into screwed steel conduit throughout and special precautions were taken to prevent oil and ink creeping into junction boxes, a simply effective method being to treat all joints with aluminium-paint.

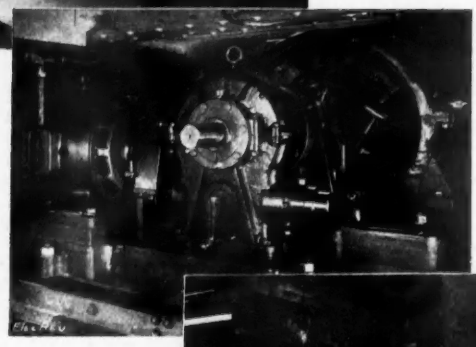
The whole of the printing-press driving equipments and their 66 paper-roll stands are of Witton James manufacture. Each of the stands is operated by two 2-h.p. motors and they are fully automatic push-button controlled with respect to speed of rotation during the roll-changing operation. All master-control stations are provided with Evershed & Vignoles electrical load and paper speed indicators which have been specially designed to withstand vibration. They are fitted on swing brackets to enable the indicating instruments to face either way, the latter being graded to a maximum of 40,000 copies per hour, and they afford a ready means of indication to the machine minders should hot bearings develop.

Special features were called for in the main press-control arrangements, such as full auto-control of the roll stands from the machine-room floor of the paper tension and margin; also emergency and reverse buttons at each master-control station, enabling press hands to bar a press back without having to call for the assistance of engineers or electricians. The emergency controls have red lamps to indicate when a button has been pressed and there is also a green signal lamp at each master-control and "stop" and "lock" boxes to indicate when a lock button is "in" and the press is safe to work upon. These green lamps also save considerable time, as when a lock button is "in" the fact is indicated on all boxes in that particular combination of machines; there are as many as 64 boxes, any one of which would prevent the press running. There are also yellow lamps which indicate to the machine minders when paper reels are being changed, &c.

Packing Room and Example of Concealed Lighting

Copies of the printed paper are conveyed from the machine room to the warehouse or packing room by 33 leather-belt three-fork elevators driven by 2-h.p. ball-bearing J. H. Holmes totally-enclosed motors, which have "Watford" auto-starters, features of the latter being the starting and speed-regulating

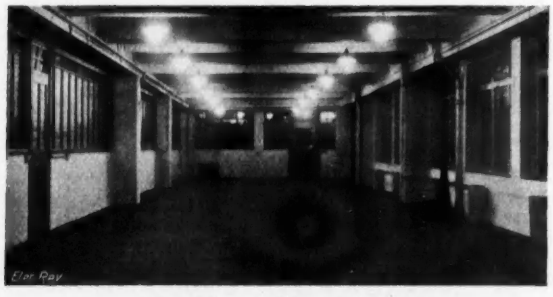




system. When a press commences to run and its elevator is required a green lamp is operated from the machine-room floor, the actual motor starting being done above in the packing room to ensure the presence of an operator who accepts delivery and so avoids congestion of that elevator. The controller is governed by an accelerator (up to 18,000-copy speed) and decelerator box fitted in the machine room, which enables the elevator speed to be regulated to suit the output of the particular press it serves, which cannot be altered at the delivery end, and runs at a maximum speed of 40,000 copies per hour.

In the packing room stacks of papers are conveyed by endless leather belts down the centres of long tables on both sides of which the packers stand. By pressing a button with the left hand, which drops an appropriate illuminated indicator at the end of the table, the number of the packer requiring a label is shown, it being sent along to him suitably numbered. These Julius Sax indicators are operated at 24 volts, two "Crypto" motor-generator sets stepping down the 205-V d.c. service for the seven indicators. The packing room conveyors terminate in motor-van loading chutes which project into the street; being telescopic, they can be withdrawn after loading to avoid obstructing the narrow thoroughfare and marring the front elevation of the building.

A publisher's signalling system has also been installed by Rashleigh Phipps, consisting of banks of neon "Peehive"



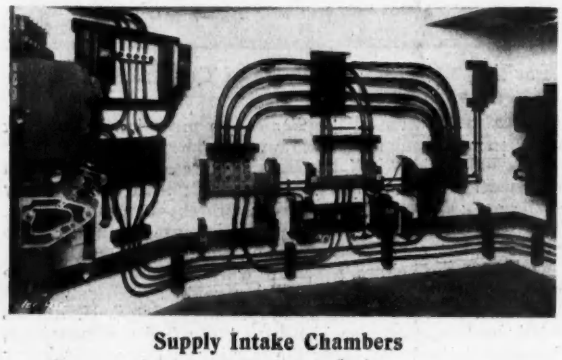
Example of Office Lighting

lamps (white for running, blue for run on, and red for stop) which indicate the output required in three sub-publishing offices as well as at the presses in the machine room. They are controllable at any one of several points. Some idea of the amount of wiring the system necessitated is afforded by the fact that 44,186 yards of multi-cored cable and 14 two-inch conduit tubes, each containing 36 wires, were used for this signalling system alone. Besides two passenger lifts, a battery of seven 1-ton "Express" lifts serve the paper-roll stands in the sub-basement from the first-floor reel stores. Those for passengers are push-button controlled when unattended, while the goods lifts are fully automatic with a 9.5-in. unloading level and single-motor contactor-controlled winding gear. All this gear is accommodated in the basement, not at the top of the lift shafts as is more usual. A reel of paper is placed in a lift from the store and sent to the sub-basement where an indicating lamp glows and a large power-operated bell rings until the doors are opened, the reel being then at the correct level to roll out on to a bogie truck without any further movement of the lift. The doors are then closed and the lift sent up again to the store where another indicating lamp glows and power-operated hooters sound until the doors are opened. The doors are designed to be fire-

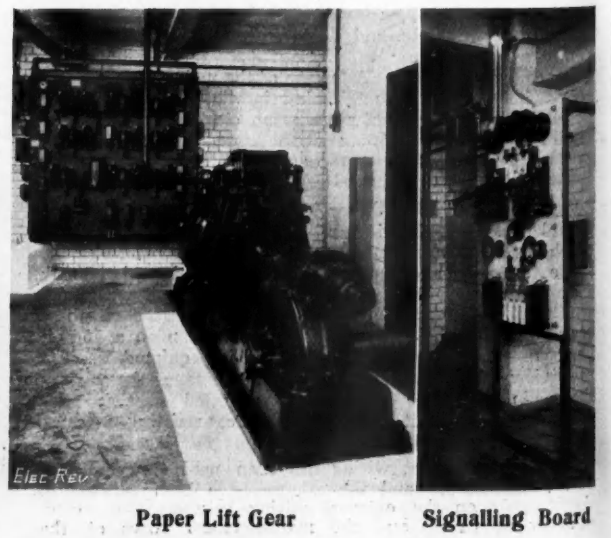
Presses, Driving Motors and Roll Stands

and smoke-proof and to form a trucking sill when open. The paper reels are hoisted up from the street to the first-floor store by two specially-designed "Express" cranes so mounted within the buildings as to be extended outwards only while in use; thus avoiding disfigurement.

Mr. Charles Nunn, chief electrician, and the proprietors, to whom we are indebted for the accompanying illustrations and permission to inspect the installation, are justly proud of the artificial illumination of the machinery spaces. Special consideration has been given to machine and roll-stand lighting; no lamps have been fixed on the presses, but a double tier of Benjamin "Biflectors" have been installed on either side to throw light into the presses without glare at any point. The roll stands have an improved type of "Rodlux" oil proof



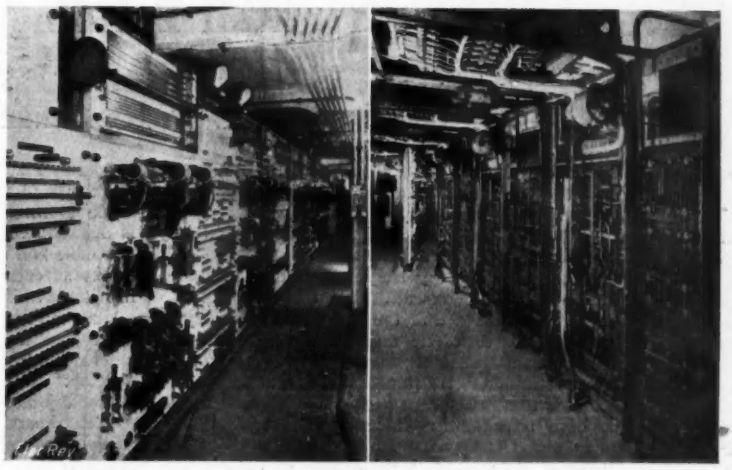
Supply Intake Chambers



Paper Lift Gear **Signalling Board**

fitting to throw light on to their chucking centres. Corrected light is employed in the composing room, where a daylight effect is obtained with Benjamin "Restlight" R.L.M. dust-proof reflector fittings. Messrs. Cash and Co. carried out the lighting contract, some 40 miles of cable having been used to wire the 1,536 points. Two of the accompanying illustrations indicate the system of office lighting adopted, some of the corridors deriving their illumination from lamps concealed behind the glass partitions.

A total of 161¼ miles of British Insulated Cable was used for power circuits alone, or 200 miles in all in the building, and 25 miles of "Simplex" conduit. Most of the control gear is of the "Watford," "Igranic," and "Brookhirst" types standardised in groups. Auxiliary equipment includes motor-driven fans and pumps, endless-rope copy carrier and Lampson pneumatic tube message conveyor (which can also be used for vacuum cleaning), Siemens inter-communicating telephones, &c.



Front and Back Views of Press Control Panels

Power from Process Steam

Some of the advantages of pass-out and back-pressure turbines

IN factories where, in addition to electrical and mechanical loads, relatively large quantities of low-pressure steam are required for heating and process work, very considerable economy results from the use of pass-out and, in certain cases, back-pressure turbines. The steam is generated at considerably higher pressure than that required for process heating and it is expanded in the turbine down to the heater pressure, the initial temperature having been so selected as to result in the superheat being practically all lost in expansion to the heater pressure.

It should be appreciated that in most heating processes the heat units are derived almost entirely from the latent (not sensible) heat of the steam, so that the heater pressure should be kept as low as possible in order to derive the maximum work from the steam. For example, at an initial pressure of 200 lb. g. and a superheat of 150 deg. F., the energy obtainable is approximately twice as great with a back pressure of 10 lb. per sq. in. g. as one of 60 lb. per sq. in. g., while the heat content of the process steam is only about 2 per cent. greater in the latter case than in the former.

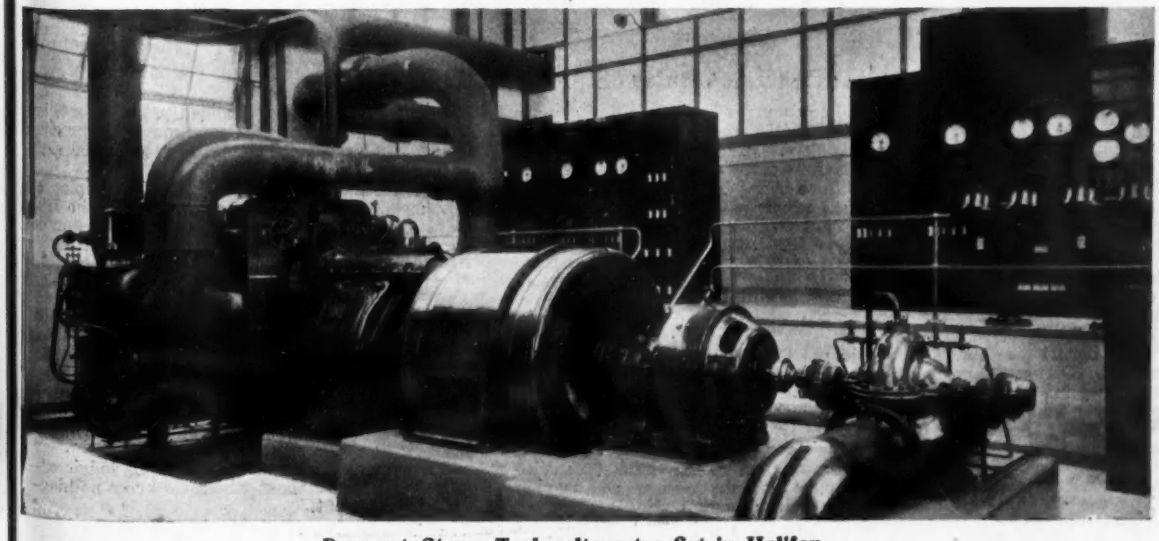
The advantage of such combined power and process systems arises out of the relatively small increase in fuel consumption necessary to generate the steam at the higher conditions. Thus the expansion of 10,000 lb. of steam from 200 lb. per sq. in. g. (superheated 150 deg. F.) to 10 lb. g. will yield about 330 kW, or 1 kW for approximately 28 lb. of steam, while to generate the steam under these initial conditions requires only about 12 per cent. more fuel than to generate at 10 lb. g., assuming equal boiler efficiencies. Assuming an evaporation of 7 lb. of steam per lb. of coal, 28 lb. of steam requires 4 lb. of fuel, so that the consumption *on account of power* under these conditions of a reducing-pressure turbine is only 12 per cent. of 4, or 0.48 lb. of coal per kW-hour; whereas if the power were generated independently by a high-pressure turbine the consumption would probably be about 13 or 14 lb. of steam per kW-hour, or about 2 lb. of fuel per kW hour.

Turbines of the pass-out type fully meet the requirements of the majority of cases, and have been installed with highly satisfactory results in paper and textile mills and in numerous other factories employing process steam. Their application should, however, be considerably increased by an improved type recently introduced by the Metropolitan-Vickers Electrical Co., Ltd., which combines an improved method of control of the pass-out pressure with the many advantages of the "self-contained" arrangement of the set, it being a development of the "self-contained" high-pressure type originated by the company a few years ago.

In this type of turbine constant pressure is maintained in the heater main, although the demand for heating steam, or the electrical load, or both together, may vary within wide limits. The pass-out control gear is actuated solely by the pressure in the heater main; it consists of a sliding disk, or diaphragm, with ports which move over the nozzles, admitting steam to the low-pressure section of the turbine and, by regulating the number of nozzles in operation, controls the quantity of steam passing to this section. Thus, if the demand for heater steam increases, the pressure in the main will tend to drop and the sliding disk will automatically close some of the low-pressure nozzles and so maintain the pressure in the heater main. At the same time, the main governor on the high-pressure end will compensate for the loss of power due to the reduction in the quantity of steam passing to the condenser, and stability is so established. The "sliding disk gear" operates through the medium of an oil relay system; special precautions in the design eliminate the possibility of leakage of oil to the turbine, or heating system.

While sets of the above-mentioned type will, in general, adequately meet the requirements of paper, textile, and other factories employing low-pressure steam, in special cases abnormally large quantities of steam are required at medium or high pressure and a combination of turbines of different types may be justified. A scheme of this nature has been installed by Synthetic Ammonia and Nitrates, Ltd.

The accompanying illustration shows a self-contained, 1,500-kW, 5,000/1,000-r.p.m., pass-out turbo-alternator set at Messrs. Paton & Baldwin's Clark Bridge mills in Halifax.



Pass-out Steam Turbo-alternator Set in Halifax

Rail Bonding

The conductivity of the return rail is an important factor in electric railway working

By A TRACTION ENGINEER

THE usual method of connecting together various lengths of rails in the case of steam-operated lines is by the use of ordinary fishplates; the problem is purely a mechanical one, and the method in use is the obvious solution. In the case of electric railways an element of complication is introduced by the fact that very frequently the track rails are used as part of the electric circuit. It is therefore necessary that the electrical resistance of the track should be kept as low as ever possible, for even under the very best of conditions this resistance reaches a considerable figure, *i.e.*, usually about twelve times the resistance of equivalent copper section. It is found that rails connected only by fishplates have nearly as high a resistance value as if the fishplates were not there at all. Consequently, it is necessary to provide some other and better path for the flow of electricity from length to length of rail. The method universally used is known as bonding, and the problem is the two-fold one of maintaining a low resistance value and a high mechanical strength to withstand the pounding action to which the bond is subjected.

The bond, which is invariably made of copper, may be of any of the following types:—

(*a*) Expanded Terminal Bonds.—The holes in the rails are thoroughly cleaned. The ends of the strands forming the bond are welded up solid to form terminals, and these terminals are then expanded mechanically into the holes in the rail webs.

(*b*) Welded Bonds.—The method of welding may be either gas or electric arc, or the more recent thermit welding. This type is both more expensive and more difficult to establish successfully, whilst the rigidity of the resulting joint has not infrequently been a source of trouble. Care must also be exercised to ensure that the heat developed in the welding process does not result in a somewhat brittle bond.

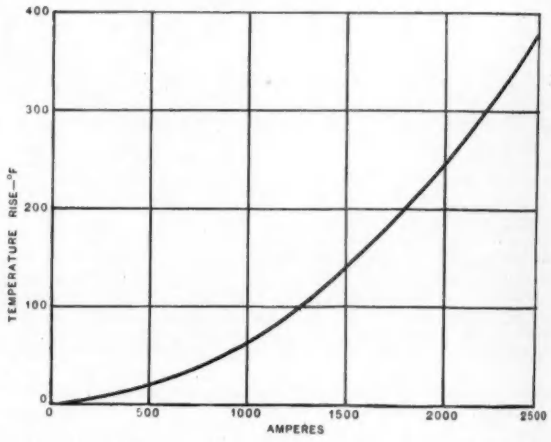
(*c*) Soldered Bonds.—This form of bonding is not used to the same extent as the two methods already noted, but it has undoubtedly proved successful in some cases. The stranded conductor terminates in two solid heads which are soldered to the rail. Trouble has sometimes been experienced in getting a soldered joint which will withstand the vibration, whilst, in addition, there is the danger of the solder melting should the bond have to carry a higher current than normally. Brazed joints are not so prone to these defects.

The difference in the various types, it will be noted, is in the method of connecting the copper to the steel rail. The bond itself is invariably in the form of stranded copper, in order to provide flexibility, although solid copper bonds are often used for street tramways. In the latter, of course, the track has much more solid foundations than in the case of railways, and it is not necessary to provide for play of any appreciable magnitude between the rails.

Sometimes the bonds are fitted underneath the fishplates, in which case they are protected from mechanical damage. At the same time, should a bad joint develop between bond terminals and rail, it is necessary to remove the fishplate in order to make good the defect. Alternatively, the holes for the bond terminals may be provided beyond the ends of the fishplates and the copper made of sufficient length to span the fishplate. Here we have a type of bond which is more liable to mechanical damage, but which, at the same time, is much more accessible for repairs.

Double bonding, that is, the provision of two separate copper bonds at each rail joint, is frequently provided. This, too, has its advantages and disadvantages. The idea is to ensure a path of low resistance in case one bond suffers damage. On the other hand, there are double the number of contacts where failure may take place or where bad joints may develop. Indeed, it is quite possible for a considerable number of such joints to develop along the track, the remaining efficient bonds forming the path for the current. What is really happening, then, is that such parts of the track are being carried by a system of ordinary single bonding. Of course, double bonding may be necessary in order to dissipate the heat generated by the passage of the current, in which case the limiting factor is temperature rise.

All bonds are designed with heating as one of the chief factors. The heating is approximately proportional to the square of the current, the bond being more or less free to radiate its heat to the air. Where the bond is secured under the fishplate the heat has to be transmitted through the steel and cannot get away so easily. A higher temperature rise is, in consequence, experienced with this type of bond. The approximate temperature rise of bonds exposed to air is illustrated by the curve given above.



Relation between Temperature Rise and Current

In addition to the provision of bonds connecting the various lengths of rail, it is necessary to connect the two rails together at intervals of about 100 yards in order that the full value of the rail conductivity may be used. The bond in this case is invariably a solid copper rod, the ends of which are formed into terminals.

Patent Agents in the I.F.S.

Until 1929 almost all the patent and trade mark business in the Irish Free State was carried out by British patent agents operating frequently through Irish offices. In the natural course of events the Free State Legislature passed an Act requiring all such business to be done by qualified persons, registered at the Industrial and Commercial Property Office under the Ministry of Industry and Commerce, who both resided and had their place of business in the Free State.

Pending the drafting and enactment of this new law the Ministry had instituted a Register of Patent Agents wherein all the existing British practitioners who desired to maintain their Irish connections entered themselves and presumed themselves safe from interference thereafter. It came as a great shock to those agents who did not reside in the Free State and perhaps had no place of business there, to be served with a notice from the Minister that their names would be removed from the register unless they complied in both those respects with the 1929 Act. The amount of business to be done in the Free State when shared between all the registered agents did not make it worth any British agents' while to set up a Free State branch office, but the arrangement in vogue for many years was to have the Irish business initiated in the office of some resident sub-agent (who probably was not a qualified patent agent, but a person of wide experience) and carried through in the office in Great Britain. That system seems to have operated satisfactorily.

The legality of the Minister's summary action in wiping all the non-resident agents off the register was tested in the Irish Free State Courts on May 18th when Mr. Justice Johnston delivered judgment with costs against the Minister in an action brought by a firm of agents residing in Glasgow.

The learned Judge arrived at his conclusion from the plain wording of the Act, without having recourse to the general principles of interpretation to which Counsel had referred him. He said it was plain that the Act had no reference whatever to those agents who were registered prior to 12 o'clock on the night of August 18th, 1929, but was a Statute which applied to eligibility on and after that date. The plaintiff had never ceased to conform with the conditions of eligibility which had enabled him to be registered, consequently he was entitled to remain on the register.

With the plain commonsense and equity of this judgment—leaving aside the legal aspect about which we know nothing—we are in cordial agreement.

The Jordan River Scheme

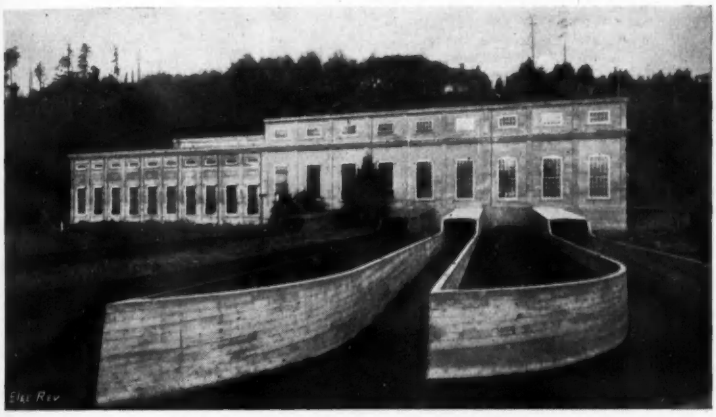
The final development of a Vancouver Island hydro-electric power station

By F. H. FULLERTON

THE completion of the Jordan River power station during the closing months of 1930 marked the conclusion of a plan of development inaugurated in 1925 by the British Columbia Electric Railway Company to serve the city of Victoria and adjacent municipalities on the southern part of Vancouver Island, B.C. The company is a subsidiary of the British Columbia Power Corporation, which is in turn a subsidiary of the Power Corporation of Canada. It has a number of very large power plants on the mainland of British Columbia, and several more on Vancouver Island, the largest of which is the Jordan River development. The company now holds the water rights for development of the Campbell River Falls at the northern end of Vancouver Island, and when this development is undertaken it will be one of the major hydro-electric schemes executed in British Columbia.

Main Diversion and Storage Dam

The work at Jordan River called for the enlargement of the main flume, a timber box waterway some 5.3 miles in length, which conveys the water from the point of diversion, and the impounding of the Jordan River waters in the balancing reservoir at forebay, where the water is held at the head of the pipe lines serving the impulse power wheels at sea level, two miles distant.



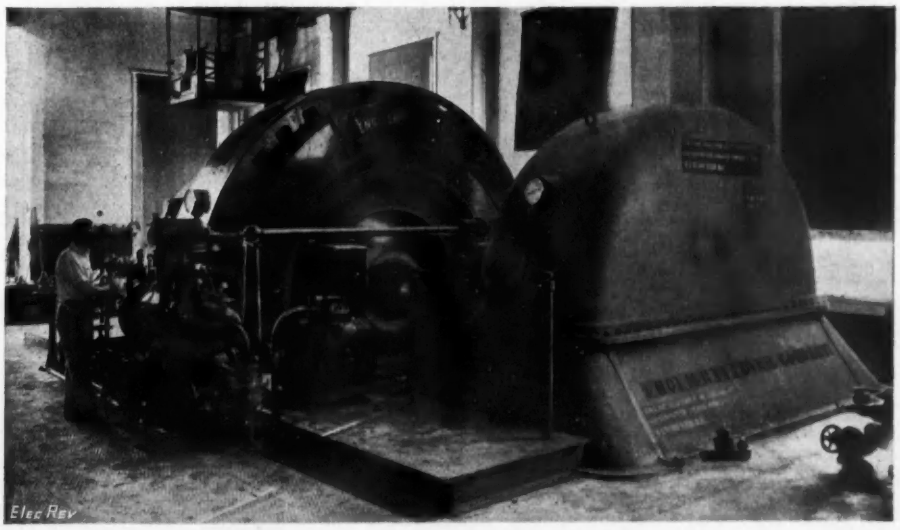
Main Power House and Tail Races

The second step in the extension plan provided for the construction of a flashboard structure in the spillway of the diversion dam, the erection of which, in the following year (1926) increased the capacity of the pondage of this reservoir by 1,620,000 kWh.

During the construction season of 1928 a single-unit power plant, consisting of a vertical Francis - type turbine, direct-connected to a 1,875-kVA generator, was installed within the diversion-dam structure, utilising the head due to the elevation of the diversion reservoir above the water in the chamber at the dam's outlet. This plant operates at varying loads, according to the water requirements of the main Jordan River plant, as the water, after having passed through its wheel, empties into the main flume and, in consequence, is controlled by the demands upon the flume. With the flume flowing full, the diversion unit is then operating at capacity. In the year 1929 the main flume enlargement was completed, as well as instituting and carrying through to completion the raising of the two earth-filled dams which provide the storage basin at the head of the pipe lines. The extension to the reservoir capacity was necessary in order to enable this balancing reservoir to carry the power plant, including the fourth unit, over the peak loads. The first direct undertaking covering the installation of the fourth unit was also in hand during the year 1929, in the boring of a tunnel some 220 ft. in length, to provide an intake for the No. 4 penstock.

The construction season of 1930 opened on March 4th, with field gangs assembled for the carrying through of the full installation of the fourth unit, which was required to be completed and in effective operation to take care of the November peak load.

No. 4 penstock line from the forebay to the power house is 9,462 ft. in length. For 4,809 ft. from the forebay the pipe is 60 in. in diameter; from a taper piece at this point the diameter is 54 in. for a distance of 1,990 ft., and below this point to the power house it is 48 in. The pipe is of riveted steel throughout. From the forebay, for a distance of 3,503 ft., the joints are lapped, having inside and outside parallel courses, varying in thickness from ¼ in. to 9/16 in. Below this, and extending to the power house, the pipe has butt joints, the thickness of the plate varying from ½ in. to 1 1/16 in. There are twenty expansion joints in the penstock placed generally about midway between anchors. These joints are all of the slip-joint type, the stuffing boxes of which are packed with the best-quality braided flax packing impregnated with graphite. On the 48-in. diameter pipe the outer shell of the expansion joint is of cast steel—an arrangement which had much to commend it, since it permitted the use of a

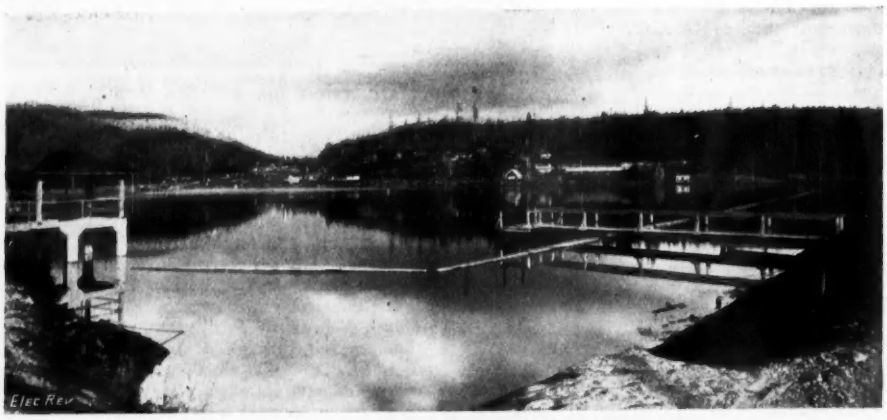


The New 15,000-kVA Generating Set

machined face and for the heavier pipe a superior joint. In the pipe line there are six cast-steel expansion joints; the balance of the expansion joints are of welded plate.

The pipe line is provided with nineteen 5-in. triplex Pelton air valves with eight-inch control gate valves. Manhole openings numbering ten are located 1,000 ft. apart along the entire length of the pipe. The weight of the steel making up the penstock line totalled 4,635,000 lb., and there were 307,000 rivets driven in its fabrication in shop and field. The pipe is entirely above the ground surface and is supported upon reinforced-concrete piers at a general height of eighteen inches. At the vertical bends in the line reinforced-concrete anchors are placed. These number 21, and contain 2,109 cubic yards of concrete. The 357 supporting piers required the placing of 996 cubic yards of concrete.

As provision for the fourth unit had been made within the power-house building at the time of the third-unit installation in the year 1914, housing work was unnecessary for the reception of the new unit with its step-up transformers and control apparatus. However, concrete machinery foundations, additional tailraces, and a permanent operating floor had to be constructed. This work, together with the installation of the generating machinery, wiring, and erection of the switchgear, was done by company's construction crews.



Fore-bay Reservoir and Penstock Control Towers

The new unit is a 15,000-kVA, 6,600-volt, 60-cycle, three-phase, English Electric set, driven at 300 r.p.m. by two 18,000-b.h.p. tangential water-wheels, one mounted on each end of the shaft and overhanging the bearings. The shaft is of special carbon steel with ends forged up to provide flanges to which the runners are bolted.

The two wheels on this unit are supplied with water through a flanged cast-steel Y-pipe, which is bolted to a companion flange rivetted to the end of the pressure pipe immediately behind the unit foundation. To the branches of the breeches pipe are bolted the main valves of the cylindrical balanced type, which is especially suitable for high head developments. The largest valve of this type made to date is that installed in the completely automatic Alouette power station of the mainland system of the company; this is also a product of the English Electric Company. Water is supplied to the wheels through short inlet bends connected to the flanges of the main valves and thence through the nozzle under the regulation of the " Seewer " governing device, the design of which is based on the principle of the rapid destruction of the energy of the jet. This is obtained by placing blades in the nozzle at a slight angle to the normal direction of the water stream, so that the jet issuing from the nozzle no longer remains cylindrical, but is dispersed in a hollow conical form, thus diverting the energy of the jet from the buckets of the wheel. The blades, normally withdrawn into the hollow spear head, are carried by a sliding ring, which is connected to the speed governor by a rod passing through the spindle of the spear. When a sudden drop in load occurs and the speed rises, the blades are pushed forward into the water stream, imparting to it a whirling motion, thus diffusing the jet and making it lose its useful energy. The spears are operated by servo-motors with pistons fixed directly to the spear stems, the cylinders themselves being bolted to the inlet bends. The spears are both opened and closed by water pressure admitted by pilot valves operated by the diffuser rod. When the diffuser is pushed forward by the governor, the spear follows slowly, the water from the opening side of its servo-motor being exhausted through a time control screw.

Owing to the very small forces required in regulation, the use of the single governor located between the two wheels was made possible. The governor is of the oil-pressure type and is gear driven from the main shaft. It has two principal parts —the actuator—or controlling part (which is essentially a pendulum) and the servo-motor, or operating part.

The actuator is mounted on the servo-motor and is completely enclosed in a dustproof casing. The driving flexible coupling blade is connected directly to the pendulum housing. The servo-motor has a differential piston, the closing side of which is always under the pipe-line water pressure controlled by the actuator. The oil pressure is supplied by a rotary gear pump bolted to the servo-motor base and driven by an electric motor.

The overspeed governing device is of the " steam turbine " type, and consists of a movable weight mounted on the main shaft and held in position by a powerful spring. If the speed of the set rises above the given value, the spring is overcome by the centrifugal force and the weight takes up a limiting position, thereby tripping a trigger, which releases the governor oil pressure (diffusers moving rapidly into the jet, spears following slowly), and at the same time closing the cylindrical balanced main valves by remote control.

Excitation is provided by a 250-kW, 125-V, 2,000-A generator direct connected to a 373-b.h.p. 2,300-volt squirrel-cage motor of the " across the line starting " type. The capacity of this motor-generator set is sufficient to excite the fields of all four units in the station.

The transformer equipment consists of a single bank of three 5,000-kVA, 60-kV/6.6-kV transformers of the oil-immersed, water-cooled type, for a three-phase, 60-cycle circuit with grounded high-voltage neutral; the high-voltage windings are star connected and the low-voltage windings are delta connected. One spare transformer having dual low-voltage windings is held as a spare to replace any one of the above three transformers, or any one of the other station 2,200/36,400-V transformers. The transformers are set in compartments along the back wall of the generator room.

The completion of the fourth unit installation brings the generating capacity of the Jordan River power station to 32,875 kVA.

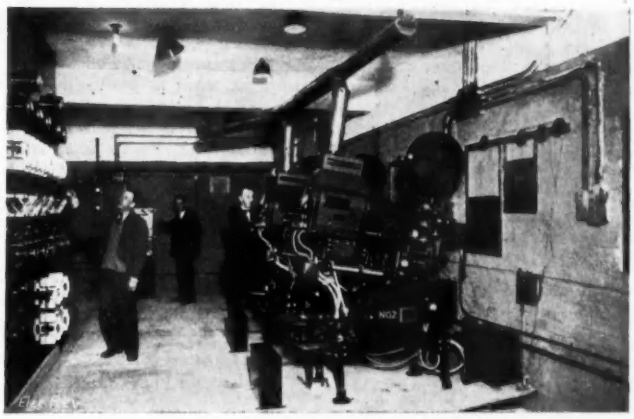
Storage basins developed within the Jordan River watershed are two in number—the diversion reservoir and the Bear Creek reservoir. The concrete diversion dam stands at its full possible height, impounding 705,300,000 cu. ft. of water, equivalent to 11,755,000 kWh. The 50-ft. hydraulic-fill dam at Bear Creek provides storage for 328,000,000 cu. ft.

Based on a study of the curve of expectance covering anticipated power demands of the near future, it would seem that additional storage must soon be created at Jordan River, and Bear Creek reservoir enlargement is the only source of additional storage available within the Jordan River watershed. The company has obtained the water rights upon the Campbell River, a 110,000-h.p. hydro-electric project from which the island system's future power requirements undoubtedly will be drawn.

Section of New Penstock

New Manchester Kinema

Close co-operation between the proprietors and architect and the supply undertaking in the initial stages resulted in the electrical installation being a limiting feature in the whole design of the premises

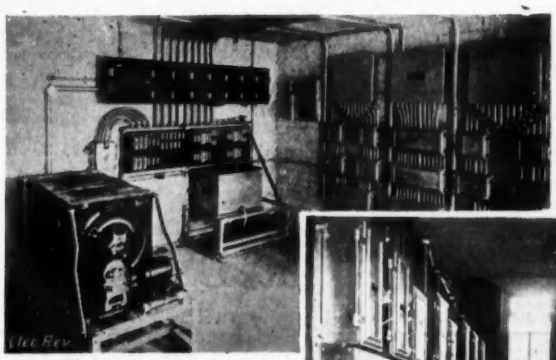


MR. H. G. WELLS, speaking recently at the Royal Institute of British Architects, said "Light is becoming a material for architecture—you can do anything you like with powerful lights." The truth of this remark is well illustrated by the Capitol Theatre, a new kinema, "talkie" house and restaurant that has recently been opened at East Didsbury, Manchester. This theatre has seating accommodation for 1,500 people, and has a connected lighting load of 250 kW for internal decoration of the building, 48 kW for external decoration, and 75 kW for the ordinary illumination of corridors, offices, and the restaurant. When shopkeepers and business houses realise the publicity value and other advantages of light to the extent that these advantages have already been realised by progressive kinema proprietors, it will mean a rapid and very useful increase of load for supply undertakings. The architect of the Capitol Theatre has never lost sight of the requirements of the lighting installation. The whole building is, in effect, one large and well-designed lighting fitting. When only the clear lamps used for cleaning are

Projector M.G. Equipment

light the hall looks somewhat bare and unfinished; during the performance the same walls and ceilings glow with rich colours that blend and change to suit the mood of the audience and the incidence of the performance.

The present development of cinema entertainment now seems to lie in the direction of an alliance of the stage and screen. Live actors and actresses on the stage will always retain a strong personal appeal to the imagination of the masses. For a time, no doubt, the screen, with its greater possibilities of spectacular presentation, has encroached on the sphere of the legitimate stage, but there are signs that this tendency is now on the wane. Most modern kinemas now have stage equipment suitable for including variety and vaudeville turns in their programmes; the Capitol Theatre has a large stage, fully equipped with electrical gear, that could do full justice to a modern revue or musical comedy.



Lighting Dimming Control Equipment

The electrical equipment for this theatre was decided on before building was commenced. A close study was made of the probable hours of use and consumption of the various classes of load it was proposed to instal. This was discussed with the electricity supply authority, and it was possible to obtain the approximate running cost of each class, and hence decide whether each item would justify its installation, either by its publicity value or other advantage. Proceeding on these lines it was decided that the only possible application of electricity that was not likely to be an economic proposition in this theatre was the building heating, which, except in the case of certain offices, has been provided by a coke-fired boiler. When once the electrical equipment had been decided upon it formed a limiting feature in the design of the whole premises.

Electricity is supplied from the Manchester Corporation's mains at 6,600 V to a separate sub-station built adjacent to the theatre, in which it is transformed down to 400 V, 3-phase, and taken by two 0.25-sq. in., 4-core cables to the main intake room. On the switchboard in this room the supply is split into two main circuits, one for all ordinary illumination, and the other for colour lights, cooking, water heating, and all power purposes.

The auditorium is rectangular in shape, and the ceiling is arched over from a false cornice on either side, which masks the coloured lights that serve to decorate the house. There is very little decoration of the conventional type; mouldings on the ceiling break up the light and give variety to the light effects. The cornices are painted in bright colours which blend with the lighting effects, and the lower part of the walls have received a brown wash which prevents people sitting at the edges of the house being subjected to an uncomfortable intensity of reflected light.

The stage measures 50 ft. by 30 ft., and is equipped with four colour footlights and battens, eight dips, and various spot lights and other special effects. An orchestra lift has been installed which carries a platform large enough to accommodate a full orchestra. This is operated by a 20-h.p. motor, controlled by push-button, so that the orchestra can be raised to stage level during special musical items. The organ console is situated in the orchestra, but is on a separate lift, which can be operated either independently or in conjunction with the orchestra lift. On the same circuit as the foregoing are the motors, totalling 5 h.p., driving the vacuum plant, the organ-blower motor of 3½ h.p., an accelerator-pump motor of 1 h.p. used on the hot-water heating system, and a proportion of the stage-lighting effects. The motor driving the organ console lift is of 3½ h.p. rating.

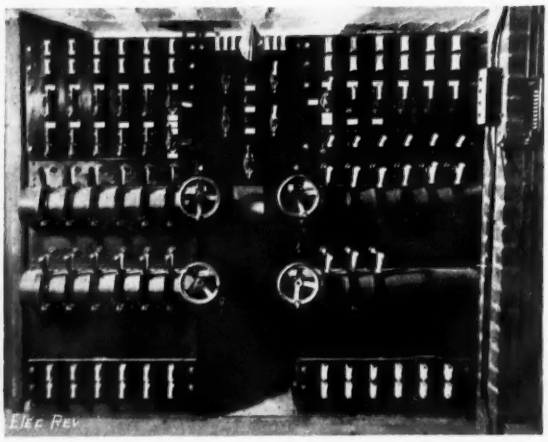
The kitchen is equipped for an output of 100 lunches, and 500 coffees and light refreshments per day. The equipment is all-electric, and includes an automatic milk boiler and coffee maker, a cooker, a griller and toaster, an air compressor for the soda fountain, and a small refrigerator. All the domestic hot water required in the building is provided by immersion heaters fixed in heat-insulated storage tanks, and controlled by thermostat. A daily consumption of 250 gallons of water

Main Electricity Supply Intake Room

at 180 deg. F. has been allowed for, and is provided by a total connection of 15 kW of heaters.

It is very important that apparatus used in a cinema, when talking pictures are being shown, should not be noisy. For this reason it was decided that certain plant, such as ventilating fans for screen-curtain lifting and screen-masking gear, should be operated by d.c. equipment, and a suitable supply is given at 200 V from a 15-A mercury-rectifier set; a motor-generator set, rated at 15 A, 200 V, on the d.c. side, being provided for stand-by purposes.

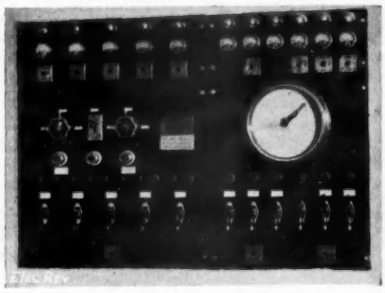
The emergency lighting of a cinema is a very important matter. There is a special emergency circuit with lamps at



Stage-lighting Control Equipment

such points as staircases and exits, in the auditorium and in every room connected with the premises, that are always alight. This circuit is brought back to an automatic change-over switch of a special "Keepalite" panel. The supply is normally a.c. at 100 V, fed from a small transformer, but should the public supply fail at any time the change-over switch operates automatically and transfers the pilot lighting to a 100-V, 60-Ah battery which is charged continuously from a trickle-charge rectifier, the whole equipment being supplied by the Chloride Electrical Storage Co., Ltd.

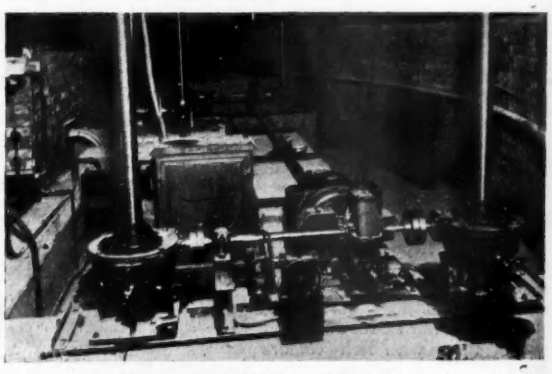
The operating box is exceedingly roomy, and has been carefully designed, so that the operators will work under cool and comfortable conditions. Provision has been made for the installation of three projectors, of which two "Erneman" units only are installed at present. Western electric "talkie" apparatus is also installed. Two spot lights and the control panel for the Holophane colour lighting are also accommodated in the operating box. The supply to the projectors is d.c., 200 V, from two motor-generators, each of 200 A rating. The motor-generator plant provides a reserve capacity which may be required later should high-intensity arcs be necessary for a specially wide screen.



Automatic Switchboard

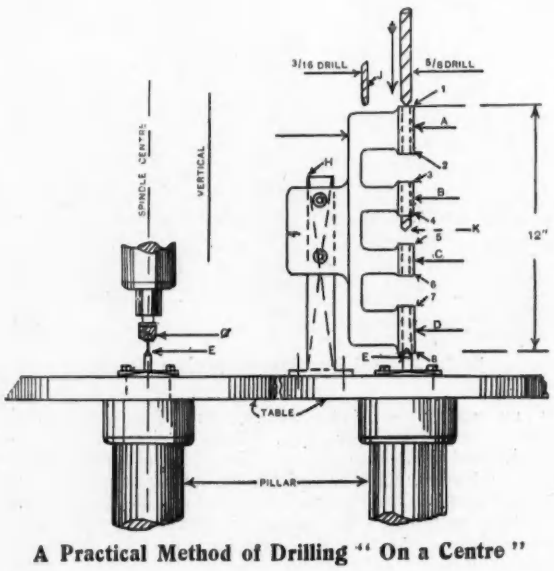
Externally electricity has been used freely to advertise the house. On the roof are four large signs, each showing the name "Capitol" in gilt letters 6 ft. high. Each letter is backed by a trough holding concealed red lights, and at night the effect of neon signs is given. The total load on the roof signs is 23 kW. In six turrets on the roof, 80 ft. above ground level, are housed 1,000-W special projector lamps that throw beams of light from various angles and can be seen from a great distance. The walls of the building are illuminated by twenty-five 500-W floodlights fixed on brackets at about 12 ft. above ground level, and canopy lighting of the usual type has also been provided.

The electrical equipment of the whole cinema was supplied and installed by Messrs. Kershaw. Mr. Roy, the proprietor, in addition to being a very progressive business man, is a trained electrical engineer, and is enthusiastic on the use of electricity and thoroughly acquainted with its possibilities. This is largely the reason why electrical equipment on such a lavish scale has been installed, and why the Capitol Theatre has set a new standard in cinema design.



Orchestra-lift Operating Gear

Alignment Drilling



A Practical Method of Drilling "On a Centre"

THERE is a way known to some, though not all, drillers by which such an operation as alignment drilling of a detail, as shown herewith, may be quite easily performed with the common pillar, or radial drill; and, be it noted, without any setting up by square and (or) surface-block.

The detail, a cast-iron hinge, typical of many accessories in common use both in electrical and mechanical engineering, needs a ⅝-in. hole drilled through the four parts, A, B, C, D, all in alignment, so that, when drilled, a test-bar with a diameter two-thousandths less than ⅝ in. may be "wrung" through.

The method shown will ensure such alignment; the operations are as follows:—

(1) "Gang"-mill the eight faces (1 to 8).
(2) Centre-dot faces 1 to 8.
(3) Set the centre E "dead" under the drill-spindle centre by means of the male and female cone G.
(4) Place the detail to be drilled on the male cone E, bringing the ⅝-in. drill to the top centre, and lightly clip to the angle plate H.
(5) Remove the ⅝-in. drill, and substitute the 3/16-in. centring drill J to increase the marked centre.
(6) Substitute the ⅝-in. drill, and drill through to the line K.
(7) Reverse the detail and proceed as before.

Another way to do such a job is to place the "far" end on the tail-stock centre of a lathe; this is the way in vogue in shops where the "drilling-machine way," here described, is not known, but the latter way is, for various reasons, far preferable.

J. T. TOWLSON.

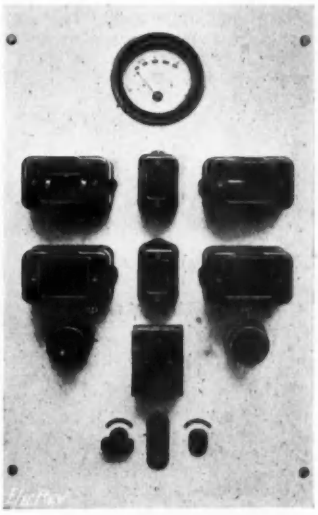
Transformers and Tap Changing

Modern methods of power transmission call for the on-load voltage regulation of transformers

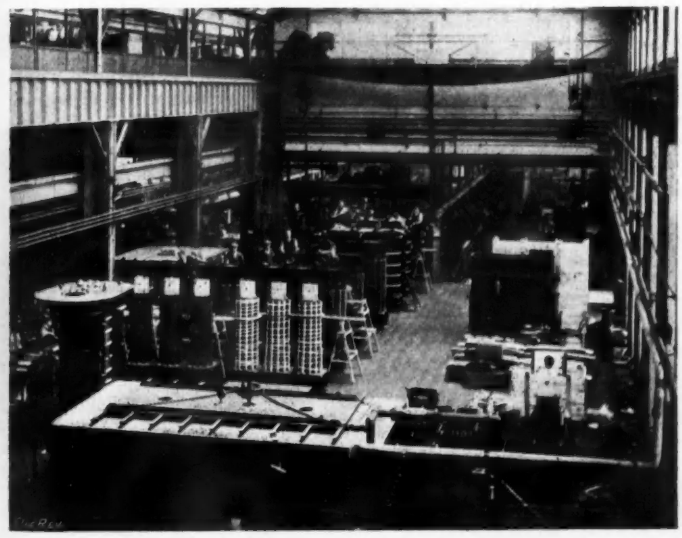
SEVERAL of the transformer ratio regulators under construction for the grid schemes were on view when we recently visited the extended works of Asea Electric, Ltd. (with whom the Fuller Electrical & Manufacturing Co., Ltd., is associated), at Walthamstow. These ratio regulators are made for either hand, remote electrical, or fully automatic control. The regulating switch for each phase is contained in a separate tank, and the oil is not in contact with the oil in the transformer tank. The regulator tanks can be readily lowered for inspection without disturbing any external connections or removing any oil; this is a point of considerable importance. The driving mechanism is contained in a weather-proof sheet-steel cubicle mounted on the side of the transformer. From the cubicle a vertical operating shaft extends upwards and connects with a horizontal shaft to which the three lead screws which operate the contacts are geared; this horizontal shaft rotates just underneath the main top tank of the ratio regulator, thus avoiding the necessity of providing oil-tight glands. A special point of the driving mechanism with electrical control is that the motor circuit is disconnected as soon as the operating motor reaches full speed, the switches being driven to the next position by means of energy stored in a flywheel on the motor shaft. The motor circuit is broken by means of a centrifugal relay placed on the end of its shaft which closes a pair of contacts when the motor attains full speed. It is thus impossible for the ratio-regulator to stop in a mid-way position between contacts in the event of a failure of supply. Another special feature of the regulator is the moving contact arm. The ratio-changing switch consists of a bakelite board carrying a double row of fixed contacts between which, mounted on and actuated by a lead screw, is the moving contact arm. Opposite pairs of fixed contacts are connected together and to one tapping of the transformer. The contact arm is so driven that one end of the arm moves from one fixed contact to the next before the other end begins to move. This connection enables a resistance to be inserted between the two tappings during the ratio change; the resistance is fitted at the back of the bakelite contact board which is rated to carry full-load current for a reasonable period with a maximum of 60 operations per hour. The contacts on the bakelite board are spaced to withstand for three seconds a voltage between adjacent contacts equal to the normal voltage of the winding to which the tappings are connected. We were informed that this type of regulator is in satisfactory operation in many countries.

The transformers with which these voltage regulators are used vary upwards from 200 kVA so that, in conjunction with Asea boosters, both transformer and line drops may be controlled at the sub-station. For the grid scheme 44 15,000-kVA 132-kV units have been supplied or are in course of construction (all with on-load ratio-regulators) and eleven 5,000-kVA 33,000/10,850-V sets similarly equipped have just been completed for Sydney Municipal Council. The latter, which are of the fully automatic type, were the first ratio-regulators to be installed in Australia. Further exports include 130 transformers (120,000 kVA in aggregate) for the Perak River hydro-electric scheme.

The entire insulation of both the iron and the copper is carried out in the factory, the sheet-steel laminations are insulated by a special paper pasted on in machines developed by the company. It is claimed that paper is more reliable than varnish, which may disintegrate under heat and pressure, thus causing a gradual increase in the iron loss.



Control Panel for Automatic Regulation



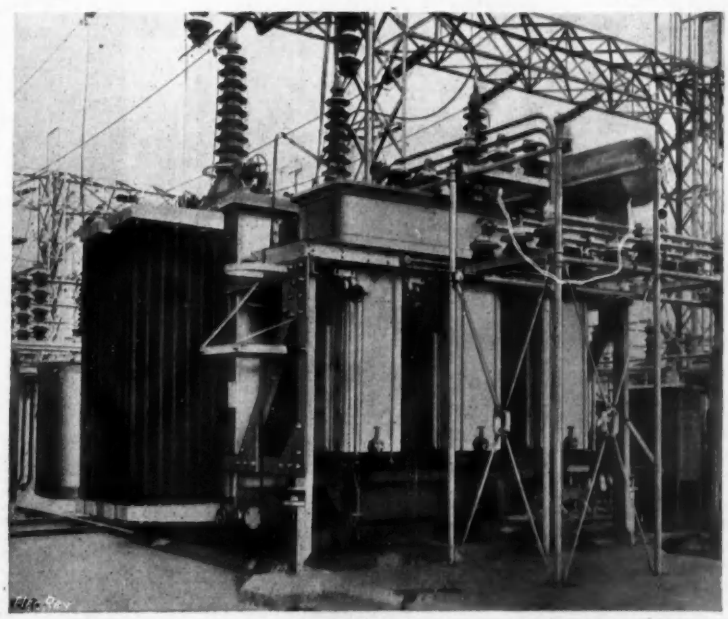
General View of Main Assembly Shop in Asea Works

The copper-covering plant comprises two large high-speed duplex machines for covering heavy-section copper and two smaller machines for the lighter sections. For the smaller transformers of low and medium voltage there are 12 spindles for covering conductors with cotton; for high-voltage work paper is always employed as a covering. A high puncture voltage for a given dielectric thickness results from the use of a paper with a thickness considerably less than that commonly used for conductor wrapping.

All joints between core and yoke are interleaved and on the larger transformers the core is sub divided to ensure adequate cooling.

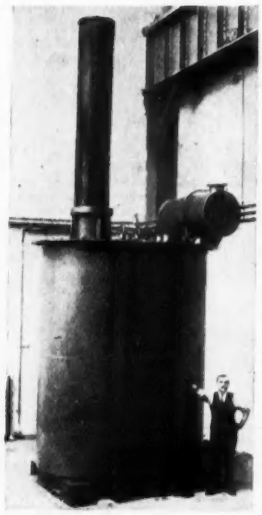
High-voltage coils are normally wound on adjustable steel formers. The heavy-current windings are wound directly on to bakelite cylinders with presspahn distance pieces and horizontal oil ducts between each turn. Incidentally the speed control obtainable by means of three-phase Asea commutator motors driving the machines is of great assistance to the winders. All windings are impregnated under pressure and vacuum dried, and afterwards further treated in a drying oven.

The steam-heated tank in the assembly shop (in which a complete transformer can be dried out and filled with oil under vacuum) is large enough to accommodate a 45,000-kVA, 3-phase, 50-cycle transformer. A compressed air system runs



A 15,000-kVA, 132 kV Transformer at Bedford Grid Sub-station

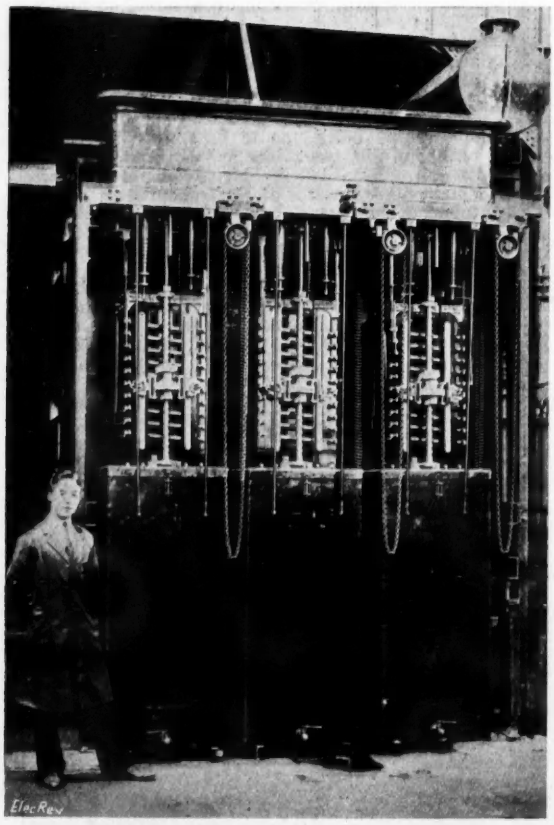
throughout the assembly shops for cleaning down and for working pneumatic tools. The main assembly bay is 235 ft. long by 50 ft. wide and is served by two cranes, with a safe working load of 75 tons; the small bay, 150 ft. by 25 ft., is served by two 5-ton cranes. The test-bed plant includes a 1,800-kVA, 3-phase, variable-frequency generator and a 1,200-kVA, 3-phase set for carrying out induced over-potential tests at frequencies above the normal. There are also 500-kV and 250-kV testing transformers. All transformers are designed to comply not only with the B.E.S.A. regulations but also with the Swedish Standardisation Rules, which call for considerably higher test pressures. For the measurement of losses wattmeters employing special resistances can be inserted in high-voltage circuits without the use of either potential or current transformers. Another interesting feature is a demonstration relay panel on which are mounted a few of the relays manufactured by the company. This panel works in conjunction with a motor-generator set in such a manner that the relays can be operated under conditions similar to those obtained in service and at the same time demonstrate their special features.



The 50-kV Testing Transformer

It was stated that the company was the first to introduce into Great Britain the gilled-tube construction of transformer tank in which a metal strip is wound on edge on the radiating tube for the purpose of increasing the cooling surface.

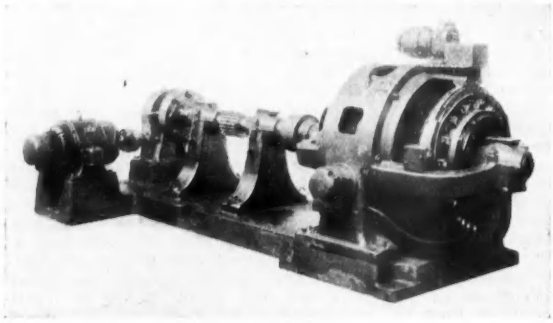
One cannot very well leave the Walthamstow works without commenting on the motors produced there. These are all constructed to jig. In the case of induction motors semi-closed slots are used in the interests of efficiency and power factor; for the larger machines bar-wound rotors are



Regulator Switch with Tanks lowered

usual. Flame- and explosion-proof slip-rings are provided for mining service in all but the smallest sizes. An interesting departure from the normal is the three-phase variable-speed commutator motor with shunt characteristics (Schräge system) and a speed range of three to one or greater; these are, as mentioned above, used for driving some of the machines in the shops where speed regulation is necessary. Single-phase commutator motors with series characteristics and a speed range of two to one are also a feature of the production in this department. Asea Electric, Ltd., is the sole agent for the single-phase repulsion-induction motors manufactured by the Century Electric Co. of St. Louis, U.S.A. A complete service and repair department has been organised for dealing with all kinds of motor repairs. The whole factory impressed us as being entirely up-to-date and very well organised.

Asea was founded in Sweden in 1883 for the manufacture of small generators and motors, with Jonas Wenström as chief engineer. The company to-day has a share capital of nearly £5 million and employs over 10,000 men, and can claim that supplies of raw materials of all kinds are under its direct super-



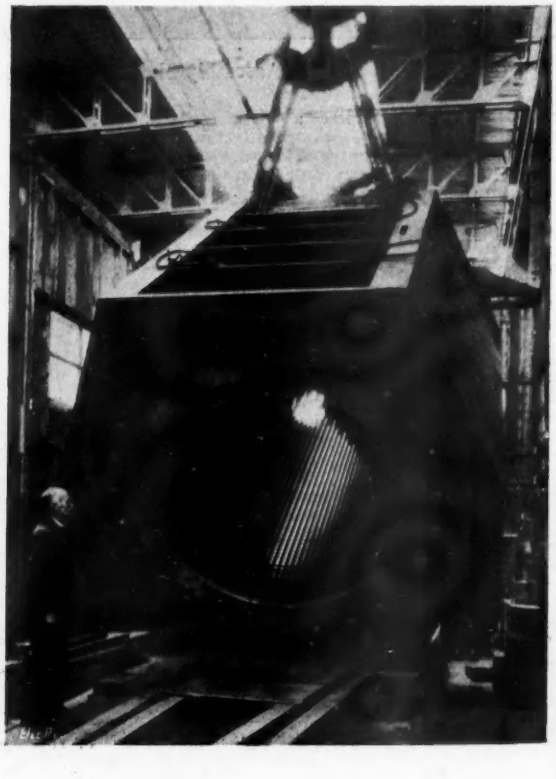
Three-phase Variable-speed 125-B.H.P. Motor for Driving Rotary Printing Press

vision. In addition to its main works at Verteras in Sweden and the works of the Fuller Electrical & Manufacturing Co., Ltd., at Walthamstow (where the labour is entirely British), the company has electrical works at Ladvika, Sweden, in Oslo, Norway, and at Jaroslavl in Russia. In addition the company owns the Surahammer steelworks, the Sorstafors paper mills (both in Sweden), the Stal works at Finspong, where Ljungstrom steam turbo-generators are made, and further works at Stockholm for the manufacture of gears, geared motors, and cables.

Ironbridge Power Station

The progress of installation work at the Ironbridge station of the West Midlands Joint Electricity Authority is indicated by the accompanying illustration, which shows the process of turning an 80-ton stator core for a B.T.H. turbo-alternator partly turned and at the point of balance. The machine is rated at 62,500 kVA, 9,500 volts, 50 cycles, 1,500 r.p.m.

As the completed stator would be too large for transportation it has been assembled on site. Fabricated steel construction, now standardised by the British Thomson-Houston Co., Ltd., is used with a view to the achievement of maximum strength with minimum weight as well as to reducing the time required for manufacture.



The "Empress of Britain"

A new fast transatlantic liner which is generously equipped electrically, some of the fittings having been specially designed

DUE to sail on her maiden voyage this week from this country to Canada, the 42,500-ton liner *Empress of Britain*, built for the Canadian Pacific Railway's Southampton-Quebec service by John Brown & Co., Ltd., at a cost of about £3,000,000, is the second largest vessel to be launched on the River Clyde. Her Yarrow boilers and John Brown engines will drive her at a speed of 24 knots.

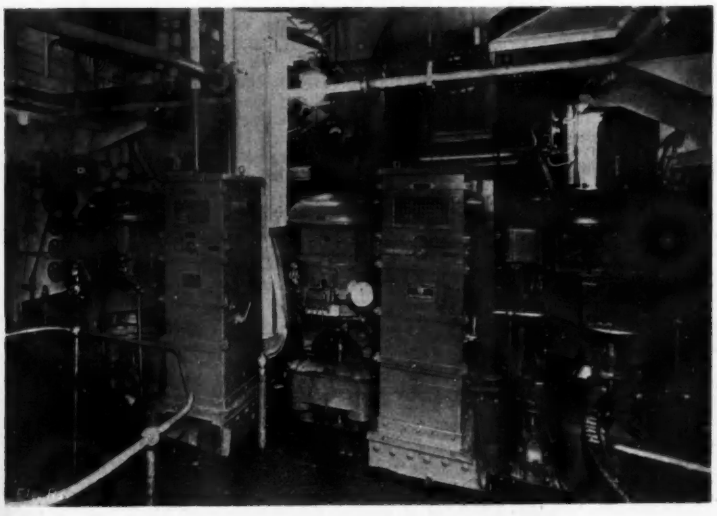
Electrically, the ship is generously equipped. The General Electric Co., Ltd., has supplied a large proportion of the lighting fittings, specially designed to harmonise with the vessel's luxurious appointments. Searchlights are installed on the bridge and the funnels are floodlighted. Some 22,000 "Osram" lamps have been used and over 2,000 fittings in the first-class apartments, besides an extensive luminous bell system and electrically-operated fire alarms. The illumination of the first-class dining-room is concealed lighting around the ceiling panels with some 1,700 ft. run of reflectors, employing 4,500 lamps; 140 "Gecoray" floodlights are used for the windows. The adjoining private dining-rooms are treated in a similar way. In the smoking-room illuminated panels are set in the columns, and produce a pleasingly soft and well-diffused lighting effect. In addition, some strikingly designed ceiling fittings of a swastika pattern are employed for overhead lighting. The scheme was carried out by H. H. Martyn & Co., Ltd., to the designs of the decorative architects.

The swimming-pool lighting is on ambitious lines, the effect being that of bright sunlight. The Turkish bath cubicles are illuminated by brackets with satin-finished etched glassware.

The passenger corridors are lighted by some 350 white metal ceiling fittings with "Equiluxo" bowls, in addition to over 1,300 fittings of kindred design. In the first-class state rooms there are some 150 gimbal table standards, while some 3,400 ft. of "Fairyland" strip equipped with colour-sprayed lamps, spaced 2 ft. apart, is used for carnival and similar lighting purposes.

As on other ships of the Canadian Pacific line, much of the control gear for the motor-driven engine-room auxiliaries was manufactured by Brookhirst Switchgear, Ltd. For the nine 37-h.p. forced lubrication pumps the starting panels are of the drum type. The steel cases are treated with anti-sulphuric enamel and a hood guards against the dripping of oil and water from above; the working parts are, where necessary, made of rustless material. The starter is of the barrel type, electrically interlocked with a double-pole contactor switch, so that if the starting operation is interrupted midway the contactor opens and can only be reclosed by returning to "off," when the whole of the resistance is in circuit; ratchet-operation gives a slow-motion step-by-step movement and the double-pole contactor, in conjunction with an overload trip, operates as a "free-handle" no-volt and overload-release circuit breaker.

Stateroom, showing Telephone



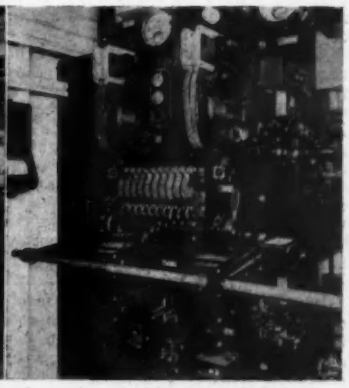
Group of Three Forced-lubrication Pumps with Control Panels

For the six 10/15-h.p. condensate water extraction pumps the control panels are similar, with the addition of a shunt-speed regulator interlocked with the circuit breaker to prevent starting with a weak field.

The control panels for the six 150/178-h.p. main circulating pumps are of the multiple lever type; the startor drum, instead of carrying the actual moving contacts, carries a series of cams which operate lever rolling-butt contacts capable of dealing with heavy currents. For the four 9-h.p. "Shanks-Drysdale" sewage expulsion pumps there are four solenoid-type automatic panels, controlled by float switches; a moving copper bar makes a full-face butt contact in turn with each of a number of spring-controlled carbon contacts. Movement is controlled by an eddy-current retarder which provides, electromagnetically, that the motor is accelerated slowly with heavy loads and more quickly with lighter loads; this device replaces the oil dashpot. The steering gear is hand-operated by open-type switchgear forming part of the main engine-room switchboard as shown below; the two 100-h.p. equipments consist each of a multiple-lever startor connected in one pole and two single-pole contactor breakers connected in parallel in the other pole. A selector switch provides against possible coil breakdown and a switch in the steering gear compartment allows "start," "stop," and "do not stop" signals to be transmitted to the engine room; there are also indicating lamps and alarm bells.

The ship has been extensively equipped with wireless telegraphy and telephony apparatus, including lifeboat installations, by the Marconi International Marine Communication Co., Ltd. There is a broadcast receiver for use with the band-repeater installation. The telephony gear has a world-wide range, and the monitoring switchboard is connected to the ship's intercommunicating system to enable passengers to use the telephones in their own rooms for speaking over the radio circuit. The left-hand picture on the adjoining page shows the main

Condenser Pump and Controller



Section of Main Switchboard

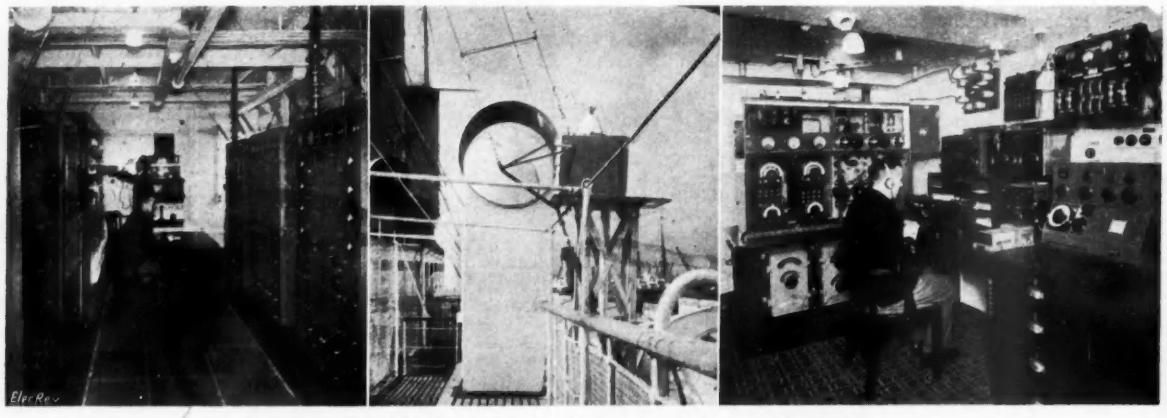
D

switchboards and rectifying units on the left, and the modulators and oscillators on the right. The centre one is a view of part of the telephone antenna and the junction box connecting the aerial to the copper-tube feeder from the transmitter; it prevents loss of power and allows the aerial to be rigged some distance away from the transmitter. The third picture shows the long-wave telegraph apparatus. The 2-kW valve transmitter is on the left, with the emergency transmitter beside it at the top (right). In the centre is the receiving equipment for all wavelengths from 15 to 20,000 metres, and on the right is the Marconi direction finder. Above are the charging boards and aerial switchgear, conveniently placed for the use of the operator, as is the special type of transmitting key shown on the desk. At the bottom (left) are the controls for the generators for the main installation. It will be noticed that all the equipment is so arranged that when the operator is seated at his table all the tuning and other controls are within reach of his hands, and all the meter dials are visible.

The ship's telephone installation is modelled on modern approved principles; a Strowger automatic dial 100-line installation is provided for the service of the ship's personnel and for the convenience of passengers 200 lines of manual telephone equipment are also installed, an attendant's cabinet affording facilities for intercommunication between the two systems and for linking with the ship-to-shore radio equipment, so that neither passengers nor crew are ever out of telephone touch with correspondents on either side of the Atlantic Ocean. The telephones installed in the various state rooms are coloured to harmonise with the general decorative scheme and are of the convenient hand-combination type, as shown in one of the accompanying illustrations.

At first sight the need for a dual service (automatic and manual) may not be apparent; for intercommunication between officers and crew the Strowger system is rapid and reliable, particularly in emergency, whereas passengers' traffic will partake of the character of requests for service, necessitating the intervention of an operator to route the calls to the right quarters for prompt attention. Hence the differentiation between the two systems, which are nevertheless appropriately interlinked when necessary. The entire equipment, together with the attendant's cabinet and telephones, was manufactured and installed by the Automatic Telephone Manufacturing Co., Ltd. The batteries used on the ship were supplied by the Tudor Accumulator Co., Ltd., and the Chloride Electrical Storage Co., Ltd.

Electric lifts serve the various store rooms and electric cooking is employed throughout the vessel. On the exposed decks and in the engine and boiler rooms rubber-insulated "Maranex" cable has been used, the main ring main being the same type of cable but paper-insulated, lead armoured and served. It is made by Callender's Cable & Construction Co., Ltd., to withstand arduous conditions, the resilient insulation over the lead sheath absorbing vibration and preventing electrolytic action, particularly when mounted on metal.



Views of the Wireless Telegraph and Telephone Installation

Mica Insulation

MICA is a mineral substance consisting in general of hydrated silicates of potassium, magnesium and aluminium. The chief mica mining centres are India and America; smaller quantities being produced in Sweden and Austria. Two main varieties occur in nature: (1) potash mica, having the composition $H_2KAl(SiO_4)_3$, known to commerce as muscovite; (2) amber-mica, or phlogopite $(HK.MgF)_2 Mg_3.Al(SiO_4)_3$.

The treatment of the mica in preparation for the market involves the removal of external heterogeneous matter; trimming of the rough mica blocks; splitting; and, finally, grading according to quality. Mica may be readily split up into very thin sheets, which vary in size from a square inch to a square foot or so. The best grades of mica can be split into sheets as thin as 0.001 inch, an operation which is carried out with much dexterity by the mica workers with an ordinary knife. Waste mica such as cuttings and pieces which, owing to impurities, cannot be easily split, is used in the production of micanite; a composition of mica and a suitable binder, such as shellac.

As an insulating material mica is one of the most important used in the electrical industries, the dielectric constant being from 5.5 to 6.0. Different grades of mica are found to be most effective for different purposes. For example, phlogopite is found to be the most suitable insulation for use in commutators, as it wears down at about the same rate as the copper bars, whereas muscovite is much too hard to allow of this. Amber mica is less affected by heat, and for this reason is superior for use in electric heating apparatus and similar purposes. For general insulating purposes where excessively high temperatures are not encountered, muscovite is preferable. The melting point of the various grades of mica lies between 1,250 to 1,390 degrees Centrigrade.

In addition to the extensive use of mica as such, there is a growing tendency to the employment of mica compounds; these are usually less costly than the natural mica, but they, simultaneously, possess good insulating properties. Ordinary micanite, consisting of mica and shellac or other binder, may be included under this heading. The introduction of shellac to mica affects the thermal conductivity as follows:—

Material	Thermal conductivity (Watt-cm. per deg. C.)
Pure mica	0.0036
Mica with 5 per cent. shellac ...	0.0022
Mica with 10 per cent. shellac ...	0.0014
Mica with 20 per cent. shellac ...	0.0011

The addition of shellac to mica has the most marked effect on the dielectric strength. The dielectric strength of a sheet of mica of 3 mils thickness is between ten and twelve thousand volts, which the addition of shellac rapidly reduces; the average commercial micanite rarely has a dielectric strength of more than one thousand volts per mil thickness.

Moulded mica is a material prepared from scrap mica by combining the mica with an adhesive varnish and a binder, then subjecting the whole to heat and hydraulic pressure. Crystal rearrangement often takes place in natural mica after a period of service in use, resulting in a considerable weakening of its insulating properties; moulded mica seldom exhibits this defect.

For the insulation of large capacity cables, mica is often ground up and incorporated with other finely divided insulating materials, such as kaolin and certain allophane clays. These substances are first intimately mixed, then a binder of pitch, resin or gum is added, and the whole is subjected to heat treatment.

The presence of a small amount of moisture in kaolin and similar materials appreciably reduces the dielectric strength, and, as in nearly every case, there is a liability to the absorption of atmospheric moisture, it is invariably the custom to dry these materials thoroughly immediately prior to incorporation with the other insulating ingredients.

An insulating material closely simulating mica is obtained by subjecting silicious earths mixed with a potassium compound to heat treatment. The product may have the identical chemical composition of natural muscovite, but is not so universal in its applications as an insulating medium, nor is its dielectric strength so high. A suspension of finely divided mica in a gum-varnish base may be advantageously employed in the coating of paper, cloth, &c., for insulation purposes.—

A. E. WILLIAMS, F.C.S.

Single Side-Band Radio-Telephony

Its application to short-wave transmission, synchronisation overcome with a precision of one part in a million

A SYSTEM of radio-telephony in which the single side band was applied to short-wave transmission was demonstrated in France on May 20th at the experimental radio station of Le Metériel Téléphonique, at Trappes, near Paris, in co-operation with the International Telephone and Telegraph Laboratories at the radio station of the Spanish National Telephone Company in Madrid.

The results represent the reward of a long search for means of applying the method, with its well known advantages, to short-wave transmission, a problem that has hitherto presented grave difficulties, chiefly relative to producing local oscillators which, while re-supplying the carrier frequency at the receiver,

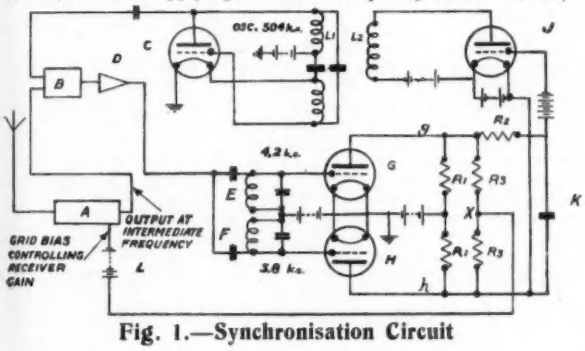


Fig. 1.—Synchronisation Circuit

would be sufficiently well synchonised with the suppressed carrier at the transmitter, for on a wavelength of 15 metres the precision required amounts to one part in one million. The method adopted is that of transmitting a continuous radio-frequency pilot wave, in addition to the speech side-band, which is used at the receiver automatically to synchronise the frequency of the local oscillator by purely electrical methods.

The pilot frequency is some 400 cycles outside the speech side-band, which has a breadth of some 3,000 cycles, so avoiding any appreciable increase in total band width. The band-width of the pilot itself is of the order of 30 cycles, so as to cater for a maximum sudden fluctuation of ±15 cycles of the carrier frequency in a period during which the synchronising circuit has not had time to take up a new stable position.

The peak voltage of the pilot is considerably below that of the side-band, to avoid reducing the power available for the side-band. As the energy in the background noise is proportional to the band-width, the level of the pilot has been fixed, at 20 db below the side-band to have the same signal-to-noise ratio. As the latter ratio must be 10 to 15 db for reasonably good speech, it is evident that the pilot will also be received under conditions in which the background noise does not prevent its utilisation. As regards the time constant of the frequency-control circuit, for commercial speech the maximum deviation of frequency between the suppressed carrier and the local oscillator at the receiver must not exceed 20 cycles per second. The maximum time that the pilot is likely to fade out due to selective fading is about half a second, during which time the local oscillator must not drift more than 20 cycles per second from the suppressed carrier frequency. This fixes the upper limit for the rate of frequency control at 40 cycles per second per second. The lower limit is given by the maximum rate of drift of the suppressed carrier frequency, which in modern transmitters will not exceed 10 cycles per second per minute; the value of the time constant is automatically changed during pilot fade-outs, the method used being shown in fig. 1. The coupling between L_1 and L_2 is less than unity, so that if the plate-filament resistance of valve J is varied the effective inductance of L_1 (the tuning inductance of valve C) will also be varied. Actually J has a low plate-filament resistance, which gives a change of about ±5 per cent. when using a mean frequency of 500 kilocycles, which is amply sufficient.

The method of controlling valve J is as follows: A represents the high-frequency amplifier, first beating oscillator, first detector, and first intermediate amplifier of the receiving set. The resulting output at 500 kilocycles is applied to the rectifier B in combination with a little of the output of the synchronised oscillator C at which the average frequency is set (504 kilocycles); the output of B is passed through the low-frequency amplifier D, which has a resonance point at 4 kilocycles. The output of D is coupled loosely and equally to the two circuits E and F, tuning to 4.2 and 3.8 kilocycles, respectively. The latter tuned circuits are connected, as shown, to the grids of the balanced rectifier-system GH. The resonance curves of E and F are so adjusted that at exactly 4 kilocycles the losses due to the two circuits are equal and at a value of about 8 db greater than the losses at the resonance points. If then the frequency of C is exactly 504 kilocycles, equal voltages will be applied to the grids of E and F, thus giving zero potential difference between the two plates of G and H.

When C differs from the incoming pilot by exactly 4 kilocycles, the potential difference between the plates of G and H is applied between the grid and filament of the control valve J, the plate coil of which is coupled to the resonant circuit of C. Assume now that the beat note between C and the pilot signal becomes slightly greater than 4 kilocycles; the plate current of rectifier G will then exceed that of H, thus increasing the negative grid bias on valve J, raising its resistance and hence lowering slightly the frequency of C, by this means tending to restore the beat note between C and the pilot to its original value of 4 kilocycles. The essential principle of the synchronising action will now be evident; in practice it is easily possible by this circuit to cause the oscillator C to follow variations of the pilot signal amounting to plus or minus 5 kilocycles, the resulting beat note never differing by more than 20 cycles from the normal value of 4 kilocycles.

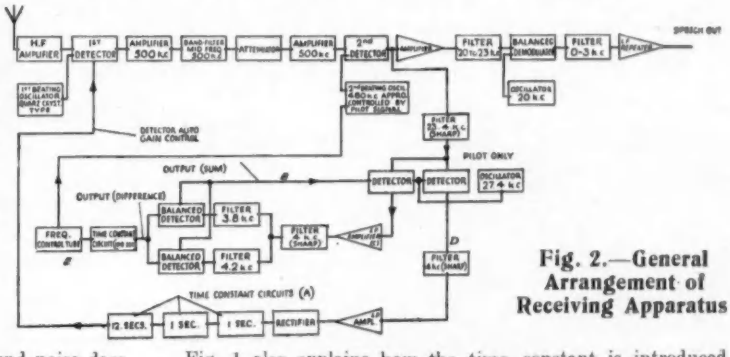


Fig. 2.—General Arrangement of Receiving Apparatus

Fig. 1 also explains how the time constant is introduced into the frequency-control circuit. The resistance R-2 is of the order of 5 megohms and condenser K about 20 microfarads, giving a time constant of 100 seconds between impulsive voltage fluctuations across GH and the grid-filament of J.

Even if exactly similar valve characteristics were obtainable, exact balance of the two plate currents could never be used in practice. Some voltage difference is always necessary between G and H in order to give the desired frequency change on oscillator C. To overcome this difficulty, automatic gain control has been added. A potential difference corresponding to the amplitude of the pilot signal (not its frequency) controls inversely the gain of the receiver in such a way that a very small change considerably alters the gain. To achieve this result resistance R-3 is added, the potential at X being the average between that of *g* and that of *h*. The receiver is shown in outline in fig. 2, a triple detection type, and the transmitter in fig. 3.

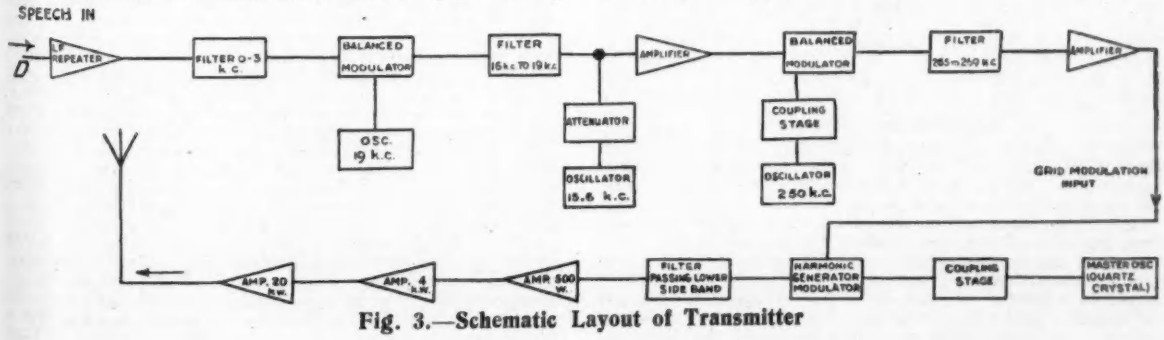


Fig. 3.—Schematic Layout of Transmitter

The Royal Society's Soirée

Some applications of X-rays and a new process of kinematography in natural colours were features of this year's display

THE annual conversazione of the Royal Society (president: Sir Frederick Gowland Hopkins) took place last week at Burlington House, Piccadilly, the customary display of scientific apparatus and demonstrations having been arranged by 35 exhibitors, 11 more than last year.

The Post Office engineering research station illustrated the distortion of speech and music due to suppression of certain frequency bands by the insertion, at will, of electrical filter networks into the amplifier.

The N.P.L. Exhibit

The National Physical Laboratory's autographic apparatus for determining inflection points in magnetic susceptibility temperature curves (Dr. J. L. Haughton and Mr. F. Adcock) uses a ferromagnetic specimen in the form of a rod 3 to 5 mm. in diameter and 1 to 3 cm. long heated in a platinum-wound furnace, the field due to the heating current being neutralised by a second winding, while a third, fed from a valve oscillator, forms the magnetising circuit. The coupling between this circuit and a search coil is varied by changes in the susceptibility of the specimen and the voltage induced in the coil, amplified and rectified by triode valves and a Westinghouse dry rectifier. These changes are registered on a "thread recorder," together with the temperature of the specimen under examination.

Photographs showing the application of X-ray crystal analysis to industrial problems (Dr. G. Shearer, Mr. W. A. Wood, and Mr. J. Thewlis) were intended to demonstrate the various types of information yielded by X-ray diffraction work. In connection with the study of metals, the illustrations showed the marked changes in the diffraction patterns of alloy steels resulting from heat treatment and the interpretation of these changes, the differences in the structure of transformer steels of low magnetic loss and the selective crystal orientation produced by cold working. Studies of electro-deposited metals show the large variations in the nature of the deposit under different electrolytic conditions. The use of the method for chemical analysis was illustrated by work on the constitution of surface scales on steels. Photographs were also shown of a variety of materials in which the size of the sub-microscopic crystals is important, of cellulose papers, jewel pivots, and other materials. The work described is undertaken on behalf of the Department of Scientific and Industrial Research.

Messrs. Adam Hilger, Ltd., among other exhibits, had a vacuum X-ray spectrograph on view, an improved form of the instrument described by Siegbahn and Magnusson (*Zeits. f. Phys.*, 62, pp. 435-456, 1930), which embodies a plane glass grating. It is intended for measurements of X-ray wavelengths which are too long to be conveniently measured by crystal grating methods, and those too short to be dealt with by the usual optical methods. An X-ray tube of the latest Siegbahn type was included.

The research laboratories of the General Electric Co., Ltd., had a collection of photographs illustrative of the applications of the X-ray Hull-Debye-Scherrer powder method of crystal analysis. Also a portable, direct-reading, self-contained bridge for use with the G.E.C. type Pirani gauges was shown, giving continuous readings of pressure from 0.30 to 0.00 mm. of mercury on two ranges. The filament resistance of the gauge varies with pressure and is measured by the out-of-balance current produced in the bridge. Slight changes in battery voltage are compensated for by using an evacuated gauge as one arm of the bridge. The apparatus as exhibited was used to demonstrate the passage of hydrogen through a palladium tube.

A block of glass shown was obtained during a flow test from a melting tank supplying glass to an automatic bulb-blowing machine. The direction of flow was obtained by introducing blue colouring matter (cobalt oxide) into the clear glass at its entry into the tank. As soon as the blue glass appeared at the machines, the tank was cooled and the glass chipped out. The block shown illustrated a portion of the glass stream diverted upwards due to convection.

In connection with convection in gasfilled lamps, according to Langmuir there is a stationary layer of gas surrounding the filament, and within this film heat is conducted away. Outside the film, the ordinary convection streams carry the energy to the bulb surface. A 100-volt, 1,000-watt lamp shown had aluminium vanes so disposed in the bulb as to show the main features of the convection streams. Clockwise motion of a vane indicated an upward moving gas stream.

Short Wireless Waves

Mr. W. Ewart Williams demonstrated the generation of short wireless waves (λ=6 to 30 cm.) by means of a mercury-vapour tube, the main oscillator being tuned to 3-6 metres. By varying the coupling between the main oscillator and a 150-cm. long Hg tube, the latter can be made to glow and show a system of standing waves. In this condition the tube acts as a short-wave radiator and, acting like a diffraction grating, gives sharply directional effects. Once the standing waves have been obtained at room temperature (Hg pressure 10^{-3} mm.), a side tube can be cooled to liquid-air temperature (pressure 10^{-6} cm.). The only effect of this on the discharge is to make the nodes extremely sharp. If the discharge is now broken, the pressure must be considerably increased before it can be again established.

Imperial Chemical Industries, Ltd., showed some apparatus used in the research department of Brunner, Mond & Co., Ltd., including a furnace with temperature control by means of a platinum resistance; application of sub-standard kinematograph apparatus to the study of crystal growth; and a thermo-regulator fitted with an adjustable steel point contact, suitable for use with a thermionic valve as a relay, for temperatures up to 100 deg. C.

Prof. W. E. Curtis's exhibit was intended to illustrate certain spectral phenomena associated with high-frequency discharges. The three tubes in operation showed (*a*) the line spectrum of mercury (pressure about 0.001 mm.) the singlet system being abnormally strong in comparison with the usual arc discharge; the marked colour change when the discharge is viewed end-on is due to absorption of the green line 5461A; (*b*) the line and band spectra of iodine (pressure about 0.2 mm.), the corresponding colour change being due both to absorption and fluorescence; (*c*) band spectrum of sulphur (pressure about 10 mm.). Photographs were exhibited of spectrum modifications and of Fabry Perot fringes obtained with high-frequency excitation and tubes showing deposits due to the discharge were also shown.

Medical Exhibit

The Strangeways Research Laboratory, Cambridge, showed the effect of split doses of radium on tissue cultures *in vitro* (Mr. F. G. Spear). Exposure to gamma rays for a sufficient period kills tissue cultures after an interval of some days. Such a (delayed) lethal dose produces the same result whether it is given in one continuous irradiation of six hours or in hourly fractions on six successive days; the action is cumulative. If cultures are given a much shorter irradiation, which only hinders cell division, the effect of splitting the dose is not cumulative. Further, the effect alters with variation in the length of the interval between the irradiations.

The correlation between growth-rate and cell division in irradiated tissue cultures (Miss S. F. Cox) indicates that after a heavy X-radiation mitosis is reduced immediately, whereas rate of growth continues practically unchanged for a further 24 hours; then a marked diminution is seen. Thus it seems probable that increase in area, after irradiation, is due more to outwandering of cells than to cell division.

The Cambridge Instrument Co., Ltd., showed a Katz instrument designed to give a continuous record of small concentrations of carbon monoxide in the air. Its action depends essentially upon the evolution of heat when carbon monoxide and oxygen combine: $2\ CO+O_2=2\ CO_2+67{,}960$ gram-calories per gram-molecule of CO. A stream of the air containing carbon monoxide passes through a mass of catalyst, hopcalite, which promotes the combustion of the carbon monoxide. The heat generated warms the gases and the catalyst mass and the rise of temperature, which is proportional to the concentration of carbon monoxide in the air, is measured by suitable thermo-couples. The recorder is calibrated to give a full-scale reading with one part by volume of carbon monoxide in 1,000 of air. The sensitivity is such that it will readily respond to four parts in 10,000.

Gold X-ray Anode

The Research Department at H.M. Royal Arsenal, Woolwich, displayed an X-ray tube with a hooded gold anode to work continuously on the pumps, designed and constructed in the Research Department, Woolwich; also appropriate radiographs. This X-ray tube runs consistently at 20 milliamperes at 360,000 volts. It is used for the examination of metallic structures, the penetration obtained showing internal flaws is 5½ inches of steel.

Mr. A. J. P. Martin's new method of demonstrating pyro-electricity and piezo-electricity in crystals consists in the use of a Dewar flask containing liquid air in which a movable metal plate is immersed. The crystal, supported on a glass fibre, is lowered into the liquid air, and on cooling (if pyro electric) develops a dipole. The liquid air is an excellent insulator, and the charges persist for a considerable time. The crystal, being charged, is attracted to the metal plate, and will follow any movement given to the latter.

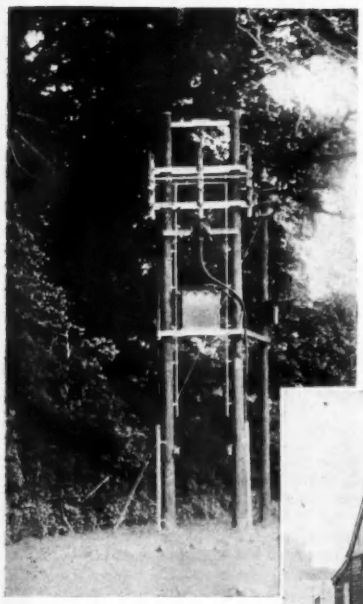
When the crystal is compressed in a clamp at atmospheric temperatures, if piezo-electric, charges are developed which soon leak away. It is then lowered, still under pressure, into the liquid air; the pressure is released only when boiling has moderated. Charges complementary to that which have leaked away are then produced. These are detected as before.

Mr. S. R. Wycherley gave a demonstration of kinematograph films in natural colours by a new process of colour photography on non-inflammable film (from the laboratories of Messrs. Spicers, Ltd.), which makes it possible to procure kinematograph pictures under practically all conditions of weather and light with a high degree of faithfulness of colour rendering. The film base is printed with a matrix consisting of some half-million red, green, and blue-violet squares to the square inch, over which is coated a panchromatic emulsion of very high sensitivity. The film is exposed in an ordinary camera and is projected by an ordinary lantern without any auxiliary apparatus.

Rural Electricity

The Bath and West Show

THE Bath and West and Southern Counties Show had for its setting this year, the beautiful surroundings of Ashton Court situated on the Somerset boundary of the city of Bristol, and the general layout was so convenient that it was possible to make a tour of the ground with the utmost comfort. From an electrical point of view, success was ensured by the proximity of the Bower Ashton sub-station of the North Somerset Electric Supply Co., by whose arrangements a supply of electricity was available at every stand. The British Electrical Development Association was not slow to take advantage of the opportunities which a show of this description afforded and its exhibits of an all-electric bungalow and dairy were big centres of attraction. Eggs graded according to weight, and marked, was a fascinating operation and formed quite a feature of the dairy. The easy manipulation of butter-churns, electric water-heaters, pumps, bottle-washers, &c., so ably demonstrated, gripped the interest of all visitors. The bungalow set forth the domestic application of electricity, and the inquiries which were made regarding the various types of apparatus, showed that the propaganda work of E.D.A. has been very effective. Probably the most noticeable feature of the mechanical side of the show was the superseding of the old agricultural steam engine by the electric motor. Farming implements derived their motive power from this source, adding greatly to the comfort of visitors by the absence of noise and smoke.



The Show Sub-station

All-electric Bungalow

On Friday the E.D.A. Council held its monthly meeting, and at the luncheon had as the guest of honour the Earl of Radnor. The Chairman of E.D.A. (Mr. R. W. L. Phillips, borough electrical engineer, Bedford), in proposing the toast of the Bath and West and Southern Counties Society, alluded to his early association with the venue of the present show, and gave a few statistics concerning the Bedfordshire electrification scheme in rural areas. Mr. Phillips said that the arrangement in Bedford with the Government was that the Treasury should advance 75 per cent. of the annual deficits, free of interest, and repayment was not to be made until the scheme became remunerative. They were limited to £8,000 over a period of ten years. Mr. Phillips said he had begun to think that he would not require all that money. There were approximately 150,000 yards of overhead lines to erect and the scheme was practically half completed. Under the scheme they had undertaken to go to everybody, having no regard to prospective revenue. Figures regarding results achieved were not yet available but he was very confident that satisfaction would be realised. They had a good customer in the Earl of Radnor who had " electrified " his estate.

The Earl of Radnor (hon. show director) in replying to the toast said that the " Bath and West " was the oldest agricultural society in the country, but it was not so old that its Council and members could not learn. The Bristol show had more electricity in use than in any other show in his experience. The credit was due to the South-West Area Committee of E.D.A. and to the North Somerset Power Co. In the past, exhibitors with appliances to demonstrate were compelled to rely on the despised petrol and paraffin motor. He hoped that the experience would be repeated and that E.D.A. would use its best influence to secure a supply from the mains at all future show grounds. Regarding the supply to rural areas his Lordship said that a supply in industrial areas was simple compared with rural distribution. It was necessary to teach the cottager to realise the true economy of electricity and persuade him to get it in—it would thus be converted from the luxury of to-day to the necessity of to-morrow. If E.D.A. could succeed in this the standard of living in the country districts would be raised to a very appreciable degree.

Our illustrations show the 11,000-V sub-station of the North Somerset Company from which the Show derived its power, the all-electric bungalow and one of the apartments in this. Further pictures appear on p. 924.

Royal Dublin Society's Show

Every year since electricity became available in the Irish Free State upon a national scale it has been necessary for the thoughtful visitor to find excuses for those British and foreign manufacturers who are directly interested in the application of electricity to agriculture in all its forms.

Sooner or later this undesirable state of things will change and it is up to the British manufacturer to see that he gets in before his foreign competitor.

Undoubtedly some excuse is necessary if these manufacturers feel urged to explain their avoidance of the most important show in a country which is almost wholly agricultural in its economic make-up. Every year we record in considerable detail the latest developments of electrical apparatus useful to the farmer and his wife as disclosed at the great French shows which are equivalent to the Royal Agricultural Society's show in Great Britain, and to the Royal Dublin Society's Spring Show in the magnificent permanent buildings and enclosures at Ballsbridge. Why is it that our special correspondent finds it necessary to inform us that there was almost nothing electrical upon which he could report? An improved detail in a milking machine, an electric incubator badly placed and not connected to the supply, and an electrically-heated chicken brooder demonstrated by State poultry instructresses, who confessed complete ignorance of the apparatus from the electrical point of view, and nothing else.

The Model Bath-room

We can find some excuse for the failure of the Electricity Supply Board to touch in any shape or form on its large stand upon the application of electricity to agriculture, because it appears to have been suffering for some time past from internal troubles, which possibly distracted its attention from the performance of its normal functions; but we can find no excuse whatsoever for the manufacturers who have let another year go by without making any attempt to impress upon the mind of the progressive Irish farmer that electricity does mean something more to him than it means to the city dweller.

We take it that the director and Council of the R.D.S. expected a good entry in the electrical machinery exhibits, because they asked Mr. R. Borlase Matthews to act on the panel of judges of the new machinery entered for the Society's silver medal, and it must have been very disappointing both to Council and judge to see only one entry in which electricity formed an essential feature.

The Tramways Conference

The supersession of small tramways and the operation of the Road Traffic Act

THE 21st annual Congress of the Tramways, Light Railways and Transport Association (the organisation of operating companies) opened last Wednesday at Margate. The arrangements for Thursday morning, after the official preliminaries, included a paper by Mr. J. A. Forde, J.P., A.M.I.E.E., M.Inst.T., general manager and engineer, Isle of Thanet Electric Supply Co., Ltd., entitled "Odds and Ends." This morning a second paper by Mr. R. S. Pittard, traffic manager, Bristol Tramways and Carriage Co., Ltd., on "The Operation of the Road Traffic Act, 1930," is to be presented.

"Odds and Ends"

Mr. Forde recalls that in 1903, when his undertaking had been in operation for about 12 months, the lighting revenue was less than 3 per cent. of that provided by the tramways, whereas in 1930 it was more than 2¼ times the amount of the latter. The prosperity of the tramways in the Isle of Thanet reached high-water mark in 1921, since when 'bus competition had caused an increasing decrease in revenue, and Mr. Forde is in favour of abandoning the tramcars. The carrying capacity of the 'bus is, he says, for all practical purposes equal to that of the tram, and while its life is relatively short, this is not a great handicap as it enables the transport system to be kept up to date. Petrol has a foreign source, but he believes that the development of the compression ignition engine, will make Great Britain independent.

The Road Traffic Act

Mr. Pittard deals with those parts of the Act and those regulations which have a direct bearing on the operation of public service vehicles. Part I of the Act applies to all mechanically propelled vehicles except tramcars, and save in certain sections trolley 'buses authorised by special Act. He points out that a licence for a new public service vehicle will not be granted until a certificate of fitness has been obtained at a cost (as laid down in Part IV of the Act) of £3, but the Minister of Transport may approve a "type" vehicle (fee £25) and a fee for a certificate of conformity to type is £1. No type of vehicle has yet been approved; apparently it is the complete vehicle that must be approved, and it is open to question as to whether the chassis manufacturer, the body builder, or the operator should obtain the certificate. Sections 4 to 8 deal with driving licences, and many additional restrictions are imposed on the applicant, and for the first time the question of physical fitness is raised. The driver holding a licence to take out a public service vehicle must also hold a driving licence, and is subject to greater control than drivers of other vehicles. The first schedule to the Act fixes the maximum speed of a public vehicle at 30 miles per hour. A first or second offence does not disqualify the offender from holding a licence, neither can a driver be convicted solely on the opinion of one witness that the limit had been exceeded. If the employer issues a time-table with which it is not practicable for the driver to comply, he may be held liable for aiding and abetting the offence.

The time that a driver may remain continuously on duty is eight hours, provided he is allowed a forty-minutes lay over. No two or more periods of time are deemed continuous periods unless they are separated by an interval of not less than half-an-hour, and presumably any period separated by more than 30 minutes becomes two periods of duty. Under the Order varying Section 19, sub-section (2) (*a*) a man is allowed to work 8½ hours straight duty where one period of duty only is worked. Where two periods are divided into unequal portions, say, two hours and six hours, the Variation Order would not come into force, and the provisions of the Act which require half-an-hour's rest after 5½ hours' duty would apply. Under the Variation Order a driver, once he has performed a straight 8½ hours' duty, cannot be permitted to work any more during that 24 hours. The variation allowing a period of rest of nine hours to be reduced to eight on one day per week for stage carriage drivers enables a change over to be conveniently arranged from late to early duty each week. The reduction of ten to eight hours on one day per week (or two days in the case of a bank holiday) in respect of express or contract drivers will permit of two long duties on consecutive days, as, for instance, on Saturday and Sunday, and on three days where a bank holiday is included.

Compulsory Insurance

Part II of the Act makes it compulsory for every vehicle to be insured against third-party risks. The Third-party Regulations (No. 1907-1930) made by the Minister on December 24th, 1930, do not apply to tramcars or trolley vehicles authorised by special Acts.

It is a general practice for proprietors to hire vehicles from others in emergency; in the event of an accident any claims by passengers would be against the proprietor with whom they had booked, but it is doubtful whether the hirer would be able to claim successfully against the insurance company covering the hired vehicle.

Licensing Conditions

Part IV is the division of the Act which most concerns members of the Association. The belief is held by some operators that vehicles constructed to carry not more than seven passengers do not come within the scope of section 61 which classifies public service vehicles. There is, however, no doubt that a vehicle of any seating capacity which regularly carries passengers for hire at separate fares is either a stage or express carriage, and is subject to the same control as passenger vehicles of greater seating capacity.

Some of the smaller coach proprietors who have been in the habit of conveying factory workers to and from work are under the impression that their vehicles are contract carriages, because they receive payment for the service from one member of the party. It is quite clearly defined in sub-section 2 that this is not so, and those desiring to continue this class of work must apply for road service licences.

Section 62 defines the traffic areas, and it will be agreed by many operators, and probably by the Commissioners, that the Minister should exercise his power under sub-section 2 and alter the limits of the existing areas. An instance is given where a main road runs from one area to the adjoining area no fewer than six times in as many miles.

Section 63 deals with the appointment of the Traffic Commissioners, and Section 64 with the procedure, providing for the hearing in public of all applications for road service licences. This is an advance on the old practice, where applications were generally heard in private by a Watch or Licensing Committee.

Section 70 makes the holder of a public service vehicle licence responsible for notifying the Commissioners of any failure or damage to the vehicle calculated to affect the safety of the passengers or persons using the highway.

Section 72 defines road service licences, and sub-section (4) (*b*) says that fares shall be so fixed as to prevent wasteful competition with alternative forms of transport. Tramway operators should clearly make representation under this section for fares to be fixed to give adequate protection to their undertakings.

Section 73 deals with the "backing" of road service licences in other areas, and it remains to be seen whether the anomaly which existed under the old *régime* of one licensing authority granting a licence and the next refusing it may not be perpetuated.

Section 75 provides for financial and statistical returns to be supplied to the Minister, and it may be found that this section will be the biggest stumbling block to the small operators, many of whom have hitherto kept no records and in many instances do not even issue tickets.

Section 77 says that a person shall not drive a public service vehicle on a road unless he is licensed for the purpose. This probably means whilst on service, but it might be held that a fitter could not drive a vehicle from one garage to another unless licensed.

The Fair Wages Clause

Section 93 will be welcomed by all operators of standing as is provides that the wages paid by the holder of a road service licence to employés, and their conditions of employment, shall not be less favourable than the wages which would be payable, and the conditions which would be observed, under contracts with Government Departments. Sub-section (2) provides that any organisation representative of the persons engaged in the road transport industry may make representations to the Commissioners to the effect that the wages paid, or the conditions of employment, are not in accordance with the requirements of the first part of this clause; matters in dispute may be referred to the Industrial Court for settlement. If it is decided by the Industrial Court that any person has been guilty of a breach of the provisions under this section, he is liable to be dealt with in all respects as if he had failed to comply with the condition of his road service licences.

Failure to comply with conditions on road service licences is dealt with under Section 74, where it states that the Commissioners "shall not revoke any licence unless owing to the *frequency* of the breach of conditions on the part of the licensee, or to the breach having been committed wilfully."

Section 97 makes void any conditions which seek to avoid liability for death or injury to passengers whilst in the vehicle or when boarding or alighting. It would seem obvious that this clause is mainly to prevent the contracting out of liability by the issue of cheap or special tickets on special conditions. In this matter we are in a worse position than the railways. Tramways and statutory undertakings generally have a bye-law making it an offence for a passenger to board or alight whilst the vehicle is moving, and in omnibus cases it has been held that such action was contributory negligence, but in the draft provisional orders governing the conduct of passengers there is no clause covering this point.

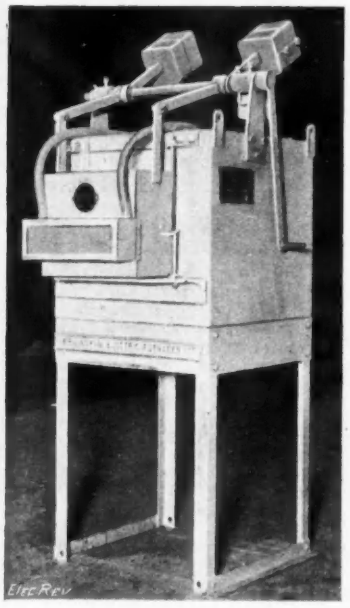
Part V authorises a local authority which is at present operating a transport undertaking to run public service vehicles on any road within their district, and with the consent of the Traffic Commissioners on roads outside their district. They are not permitted, except by consent, to run on any road belonging to a dock or harbour authority, or a railway company, but are not required to obtain the consent of adjoining local authorities.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

High-speed Steel Furnace

A "Birlec" high-speed steel furnace lately introduced by BIRMINGHAM ELECTRIC FURNACES, LTD., "Birlec" Works, Tyburn Road, Erdington, Birmingham, has as outstanding features robust construction, rapid and uniform heating, and controlled atmosphere. The last-mentioned is of great interest in that provision is made for the introduction of a neutral or slightly reducing atmosphere into the furnace chamber. By this means scaling and de-carburisation of the work being treated is prevented. The furnace is designed for operation at temperatures up to 1,350 deg. C., and is specially suitable for the hardening of high-speed steel tools, &c. By means of automatic temperature control apparatus the temperature of the furnace may be kept constant at the desired figure within very narrow limits—a further most important consideration in the heat treatment of high-speed steel. The equipment is made in four standard sizes, which have maximum ratings of 12 to 42 kW. The furnace illustrated is the second size of the range, has a hearth 12 in. by 8 in. and is rated at 20 kW.



"Birlec" H.S.2 Furnace

Vase Adaptor

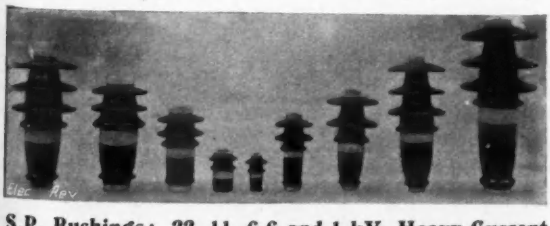
A vase adaptor lighting unit produced by WHITWORTH ELECTRIC LAMP CO., LTD., 6 and 8, Gorleston Street (North End Road), West Kensington, W.14, is designed as a means of attaching an electric lighting fitting to almost any kind of ornamental vase, &c. By screwing the steel strips up or down the central threaded rod adjustment limits of from 1½ in. to 5½ in. can be obtained for the internal grip. The top plate is of 3½ in. diameter, and is removable. The length of the stem is 7¼ in. The apparatus is finished in coinage bronze.

Whitworth Vase Adaptor

Bushing Insulators

Bushing insulators for transformers and switchgear made by STEATITE & PORCELAIN PRODUCTS, LTD., Stourport, Worcestershire, comply with the requirements of the Central Electricity Board's current specifications for the various standard voltages, but manufacturers will be particularly interested in the latest range designed in accordance with the proposed new British Standard Specification for transformer bushings. These bushings are already in production, and the company is arranging to carry a stock of the most usual sizes against urgent orders. The actual electrical design of a bushing insulator is a matter of considerable difficulty, involving calculations of stresses in combinations of three or more dielectrics in series with many causes of field distortion, so that often only actual experimental results can enable a bushing to be designed accurately to given electrical figures.

The accompanying illustrations depict a range of outdoor transformer bushings designed to C.E.B. specifications. All standard pressures up to 33 kV are catered for, and the bushings are supplied either completely assembled, with flanges, conductor stems, and all necessary fittings, or porcelains only for customers' own assembly. There are two sizes for each voltage, the smaller suitable for currents up to about 800 A, and the larger for up to 2,500 A.



S.P. Bushings; 22, 11, 6.6 and 1 kV, Heavy Current; and 1, 6.6, 11, 22 and 33 kV, Normal Current

Special Washers and Terminals

The latest radio products of Messrs. MCLEOD & MCLEOD, 329, High Holborn, W.C., include a variety of "Everlock" rust-proofed steel washers and solder-coated brass terminals. These washers and terminals have a new patented locking feature and bite well into the nuts. The company has also produced an improved type of battery cord for wireless receivers. These cords are of multi-coloured twisted rubber and are supplied in 4, 5, 6, 7, and 8 way. The same type of cord is also supplied braided, glace-cotton covered and twisted.

An Improved Cooker

The following particulars relate to the "Carronette," a cooker recently introduced by CARRON COMPANY, Carron, Falkirk. It is designed to meet the requirements of up to four persons, and the oven is double cased and efficiently lagged. The oven linings and grids are provided with suitable ventilators to ensure free circulation of the heat, and the inside casing of the oven and the combined element guards and runners are vitreous enamelled. The plug-in heating elements are disposed at the sides. An oven temperature of 350 deg. F. is obtained 20 minutes after switching on. The oven internal dimensions are 12 in. each way. The oven door is designed to give an efficient fit with the front casting. The hob is fitted with the company's new solid-type combined boiler - grill in which nichrome heating coils are enclosed in specially-made refractory tubes which run in grooves under the plate. An additional and independent "Sadia" boiling plate, 8 in. by 6 in., can also be provided. Both the boiler-grill and independent boiling plate are fitted with plug-in terminals. The underhob wiring can be inspected by the removal of a cover held in position by knurled nuts. The hob is hinged and supported in a lifted position by an automatic balance weight-catch. An adjustment for the level of the boiling plate surfaces is provided. The cooker can also be supplied as a small table or horizontal model in which the oven is mounted alongside the hob on a suitable stand. The various loadings are as follows: oven, 1,500 W; boiler-grill, 2,000 W; additional boiling plate, 1,600 W. The cooker is finished in mottled-grey and white porcelain enamel.

The "Carronette"

A Hand Drier

The "Tata" electric hand-drying apparatus has been introduced by ALLIED ENGINEERING INDUSTRIES, LTD., 4-12, Palmer Street, S.W.1, for use in hotels, schools, public buildings, &c., and particularly in the operating theatre on account of the antiseptic action of hot air. A feature is an advertising dial which is illuminated automatically when the apparatus is switched on; with suitable display this could be a useful medium for electrical propaganda. The external case is of highly-polished and chromium-plated copper, and is provided with an earth terminal. The diameter is 12 in. and the projection from the wall 10 in. The motor is suitable for both d.c. and a.c., and the total loading, including the heater, is 1,400 W. A pedal-type switch is provided.

"Tata" Hand Drier

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

Recent Contracts

Messrs. BENJAMIN ELECTRIC, LTD., have just shipped to New Zealand a consignment of "Rodalux" reflectors to be used for the lighting of the new Mount Victoria Tunnel. Particular interest attaches to the installation on account of the special arrangements which have been made in building the tunnel to allow for the semi-flush mounting of the reflectors. The spacing is being graduated to avoid sharp contrast; the intensity at the openings of the tunnel is at the maximum and is graduated down towards the minimum in the centre.

The TUDOR ACCUMULATOR CO., LTD., has received the contract for the batteries to be installed at the new headquarters of the British Broadcasting Corporation, and it will shortly commence the actual work of erection. Ten batteries are to be installed having an aggregate capacity of 77 kWh at the ten-hour rate, and ranging in size from batteries of three cells with a capacity of 1,050 Ah to three-cell batteries with a capacity of 50 Ah at the ten-hour rate of discharge. These batteries are installed to supply high- and low-tension current to the main amplifiers for the microphone circuits and also for relay operation. In order to eliminate any possibility of interruption to the service both amplifiers and batteries are duplicated in accordance with the standard B.B.C. practice.

The *Monarch of Bermuda*, which is being built for the New York-Bermuda service, is to be equipped with special Marconi radio-telephone apparatus and a band-repeater and music-playing installation. The two radio-telephone stations with which the ship will normally communicate will be at New York and Bermuda and through these stations the ship will be linked with the telephone systems of the world. The Marconi band-repeater installation will be unique both as to the extent of the installation and in the choice of entertainment available. A total of 39 loud-speakers will be installed, distributed between private suites, public rooms and dancing spaces on deck. To provide programmes, a selection can be made from broadcasting stations; from the ship's orchestra—the music of which is picked up by microphone and distributed throughout the ship from a central amplifier; and from music or other forms of entertainment by gramophone records. A control is fitted at each loud-speaker position to regulate the volume from the loud-speaker and to switch on or off as desired.

The HART ACCUMULATOR CO., LTD., has received an order for 16 batteries, each containing 60 "KB" type cells, to be installed in various electric power stations in the Northern Nile Delta electricity scheme.

STANDARD TELEPHONES AND CABLES, LTD., has received orders for repeater equipment for the Genoa and Florence Repeater Stations, from T.E.T.I., the company operating the telephone system in the fourth Italian zone. Another order received recently by the company is for supervisory remote control equipment for the Norton sub-station of the Mid-East England Scheme.

The Newcastle-upon-Tyne Electric Supply Co., Ltd., it is officially announced, has placed an order with the FOX INSTRUMENT CO., LTD., for a large instrument outfit for the Dunston power station. The instrument is intended for measuring the depth and tonnage contents in the tanks and hotwells of the power station.

It is reported that the Polish Ministry of Posts and Telegraphs has signed an agreement with the Telephone and General Trust, Ltd., for a loan of £550,000 for the extension of the Polish telephone service. Over half of the amount will be represented by equipment which is being produced by the AUTOMATIC TELEPHONE MANUFACTURING CO., LTD.

The F.B.I. and the Weir Report

At a meeting of the Executive Committee of the Federation of British Industries on May 13th, Sir Roland Nugent, the director, referred to the report of Lord Weir's Committee on Main-Line Railway Electrification. He said that the subject was of such importance to industry from various points of view that he thought that the Executive Committee would wish to appoint a committee to go carefully into the report. He suggested that such a committee might be constituted of the chairman and four members each of the Production and Transport Committees, and representatives of certain trades directly affected, such as the electrical and the coal mining industries. It was agreed that a committee on the proposed lines should be set up.

Book Notices

"Merseyside Employments for Boys & Girls—the Engineering Trades."—The third of a series of handbooks in which the various employments on Merseyside will be fully described primarily for the use of boys and girls entering employment. Electrical engineering is included in this issue.

"Kelly's Directory of Merchants, Manufacturers and Shippers of the World." Vol. I, pp. cccxxxviii+2,430; Vol II, pp. cvi+2,224. London: Kelly's Directories, Ltd. Price 64s. post free.—The contents of this work are so well known in the commercial world that they need little mention. In addition to comprising more than a million and a half names and dealing with over 20,000 places the publication is a gazetteer and contains innumerable facts and figures of the utmost value to the business man. Volume I deals with foreign countries and their possessions, while Vol. II refers to Great Britain, India, and British Dominions, colonies, protectorates, and dependencies. The work is copiously indexed in four languages.

"Sags and Tensions in Overhead Lines," by C. G. Watson, M.I.E.E. Pp. xii+192; figs. 81. London: Sir Isaac Pitman and Sons, Ltd. Price 12s. 6d. net.

"Interstate Transmission of Electric Power," by Hugh Langdon Elsbree. Pp. xiv+212. London: Oxford University Press. Price 11s. 6d. net.

The F.B.I. Mission to Canada

Sir James Lithgow and the other members of the delegation recently sent to Canada by the Federation of British Industries arrived home on Friday last. Sir James made a statement upon his arrival in which he expressed the view that a desire for closer economic relations with the Mother Country existed in Canada. There were great opportunities in the Dominion provided British industrialists took a definite initiative.

Irish Free State Electrical Imports

The appended table shows the value of the electrical machinery and apparatus imported into the Irish Free State during the three months ended March last as compared with the first quarter of 1930:—

	January-March. 1930. £	1931. £
Electrical machinery	77,698	50,541
Electric wires and cables	42,640	28,512
Electric lamps and parts	21,404	16,141
Wireless sets and parts	29,327	30,001
Other electrical goods	45,186	49,905
Copper wire	8,599	6,650
Totals ...	£224,854	£181,750

Of the six items scheduled only two show an increase. In the aggregate the quarter's imports show a falling off of £43,104.

For Sale

Manchester Corporation Electricity Department has a number of electricity meters for disposal.

(See our advertisement pages to-day.)

New Catalogues and Lists

BROOKHIRST SWITCHGEAR, LTD., Northgate Works, Chester.—Catalogue No. 14, dealing with "Brookhirst" control gear for synchronous induction motors.

G. H. CARTER & SONS, Great Eastern Road, London, E.15.—An illustrated booklet giving particulars and prices of "Carter" small-power electric motors and geared units.

GEORGE W. HUMPHREY, 25b, High Street, Wimbledon, London, S.W.19.—Particulars and prices of "Community Service" fuse-wire holders. Also a leaflet referring to the "Terrae Firmae" earthed steel conduit system.

WOLF & MORGAN, LTD., 66, Victoria Street, London, S.W.1.—Data relating to the "Wagner" single-phase motor.

The ELECTRICAL EQUIPMENT & CARBON CO., LTD., 107/111, New Oxford Street, London, W.C.1.—List M.21, giving details of "Elin" d.c. and a.c. motors and dynamos.

X-RAYS, LTD., 47, Red Lion Square, High Holborn, London, W.C.1.—An illustrated booklet describing the company's latest h.p. cable testing apparatus.

The MARCONIPHONE CO., LTD., 210-2, Tottenham Court Road, London, W.1.—A folder entitled "How it Affects You" issued in connection with the new Moorside Edge broadcasting station.

C. W. OUTRAM & CO., LTD., Woodville, Derbyshire.—A leaflet giving particulars of refractories for use in electric fires, boiling rings, &c.

M. W. WOODS, LTD., 46, Kingsway, London, W.C.2.—Leaflet M.331, dealing with the company's fractional h.p. motors with 100 per cent. starting torque.

ELLIOTT BROTHERS (LONDON), LTD., Century Works, Lewisham, London, S.E.13.—Catalogue 802 illustrating and describing "Siemens" heat economy and control apparatus. Also a number of catalogues dealing with certain specialised sections of the apparatus, such as automatic boiler control (No. 803), flue gas analysis equipment (No. 900, section 1), smoke density meters (No. 875, section 1), meters and thermometers (No. 800A), and ardometers (No. 850, section 1).

The ARORA CO., Loughborough.—A folder (H.W.31) describing the "Arora" system of constant hot-water supply.

The PALNUT CO., LTD., 26/30, Holborn Viaduct, London, E.C.1.—A catalogue containing detailed particulars of "Palnut" safety lock washers.

The STANTON IRONWORKS, LTD., near Nottingham.—The May stock list of standard "special" castings and concrete pipe.

A Prize Window Display

The illustration which accompanies this note shows a display in which originality and the topical note are combined in an attractive way. It is the window of Messrs. R. Alger & Sons, Ltd., Newport (Mon.), one of whose directors, Mr. T. E. Alger,

Messrs. Alger's Prize Window

is well-known to the electrical contracting industry as a past-president of the E.C.A. The display secured second prize in the recent annual contest organised by Hoover, Ltd. The Southport Corporation Electricity Department was awarded the first prize for two windows.

The June E.D.A. Programme

More plug points and cooking provide the main *motifs* for next month's electrical propaganda and the window layouts provided (or suggested) by the British Electrical Development Association are designed to this end. As will be seen from the accompanying illustrations of two of the three displays available, the cooking window is arranged on simple lines. It includes examples of three different designs of cooker and a number of small electrical utensils. The "three plug-points" window, on the contrary, is carried out on what, we believe, is called the "futuristic" style. While the first window imparts a simple message in a direct way, the second aims at "intriguing" the public. Not a single electrical appliance is shown; instead, the general idea of the comfort, convenience, and economy of electricity is imparted and the passer-by is offered a free booklet which will tell him the electrical story in detail. The June E.D.A. programme stresses the subject of local advertising and presents some examples of this class of propaganda carried out by supply undertakings with the Association's assistance. Particulars are given of appropriate posters and literature for the month and there is also a brief report upon activities in connection with the Electric Homes Campaign.

The E.D.A. Electric Cooking Display

A Striking E.D.A. Window for June

British Industrialists to Visit Germany

A party of British industrialists are leaving the country at the beginning of June to make a tour of German industries. The party is organised by the Industrial Welfare Society and will be personally conducted by Mr. R. R. Hyde, the Director of the Society. This enterprise of inspection is part of a policy which the Society has been pursuing for some years, under which three conducted tours of America have already been made. Industrialists interested in the enterprise should apply to the offices of the Industrial Welfare Society, 51, Palace Street, S.W.1.

Czecho-Slovakian Electrical Imports

During March last the value of electrical machinery and apparatus imported into Czecho-Slovakia was 21,415,000 crowns (£130,000) bringing up the total for the first quarter of this year to 70,479,000 cr. (£429,000).

Australian Tariff Decisions

The *Board of Trade Journal* reports that among recent Australian Customs tariff decisions are the following: Insulating cotton tapes waterproofed with substances other than rubber, oil, celluloid or nitro-cellulose, also cotton insulating tape proofed with pitch: Item No. 105 (H) (3)—20 per cent. *ad valorem*. Time switches controlled by electric master clocks, formerly admitted free of duty: Item No. 179 (B)—65 per cent. *ad valorem*.

The D.O.T. and Trade Literature

The Department of Overseas Trade states that its overseas officers are frequently placed in no inconsiderable difficulty when endeavouring at the request of some United Kingdom firm, to interest a local firm in its productions, owing to the fact that the home firm fails to provide a sufficient supply of trade literature. When only one set of a firm's literature is supplied on the occasion of a request for the name of a suitable agent, it is not an easy matter to get catalogues, &c., returned expeditiously from firms approached, who find that they have no interest in the products put before them, with the result that other firms who might be interested cannot be properly communicated with without considerable delay, if at all. It is accordingly suggested that in order to facilitate the establishment of connections such requests should be accompanied by adequate literature, and particulars of prices and terms, together with details of the basis on which it is proposed business should be conducted.

American Radio Patent Judgment

Reuter (Washington) reports that the United States Supreme Court has held that the Langmuir radio valve patent is invalid, thus reversing the decision of the Lower Court. The finding sustains the contention of the plaintiffs, the De Forest Radio Co., as against the American General Electric Co., that the Langmuir patent had not been infringed by them.

New Sub-station and Showroom for Walworth

The ceremony of laying the foundation stone of the Southwark Borough Council's new electricity sub-station and showroom in Penrose Street, Walworth, was to be performed yesterday by Councillor A. J. Patrick, chairman of the Electric Light Committee.

Visit to Steatite Works

A visit was paid to the works of the Steatite & Porcelain Products Co., Ltd., Stourport, by members of the Birmingham and Midlands Branch of the Electrical Association for Women on May 19th. Special tests and demonstrations were carried out in the h.p. department for the visitors' benefit.

An Enterprising Rural Undertaking

The Boston & District Electric Supply Co., Ltd., has sent us a copy of a booklet ("The Besco Bulletin") which it is circulating in its area. In addition to the town of Boston, the company supplies electricity in a widespread surrounding area, one of its 11,000-V lines being 24 miles long. Supplies are afforded to villages and groups of houses by means of pole-mounted transformers. The booklet contains several photographs of rural lines and sub-stations. Particulars are given in a very interesting manner of the company's service and of the uses and advantages of electricity. The company has rental and hire-purchase wiring schemes and a cooker and kettle hiring scheme, while arrangements for the hire-purchase of other appliances are also made.

The Leipzig Autumn Fairs

The autumn General Samples Fair and the Building, Household and Industrial Equipment Fair at Leipzig are to be held from August 30th to September 3rd. The latter Fair will include sections for electrical engineering exhibits and technical inventions and novelties.

A Guide to Uruguay

The latest of the Department of Overseas Trade "Hints for Commercial Visitors" deals with Uruguay (Ref. No. C.3523). This contains useful information upon travelling in the Republic, hotel accommodation, &c., as well as a section giving a summary of Uruguay's trade figures.

Electricity for Brighter Homes

The Manchester and District E.D.A. Circle, with the co-operation of ten supply undertakings in the district and the Manchester branch of the Electrical Contractors' Association, took a prominent part in the Brighter Homes Exhibition recently held in the Manchester City Hall. A stand was arranged at which

A Practical Exhibit at Manchester

the domestic uses of electricity were demonstrated in a very attractive fashion. The exhibits were properly classified into sections dealing in a practical way with cooking, washing, and water-heating and excited considerable interest among visitors. Such joint efforts are not only of value in instilling the electrical idea into the public; they are also an excellent means of securing helpful co-operation between the various sections of the industry. Mr. L. Romero, city electrical engineer, Salford, is the chairman of the Manchester Circle. We reproduce photographs of the front of the stand and of the electric washing section.

New Showrooms at Kingston

The official opening of the new electricity showrooms at 17, High Street, Kingston-on-Thames, will take place next Monday, June 1st. The ceremony will be performed by the Mayor, Councillor W. Bell, J.P.

A New Cable Trade Mark

The MERSEY CABLE WORKS, LTD., has registered the name "Merseylite" for application to its Mersey compound insulated cables.

A Novel Demonstration Van

The accompanying illustration shows a demonstration van recently put on the road by the Douglas Electric Lighting Co.,

The "Delco-Light" Demonstration Van

Ltd., sole distributors of the "Delco-Light" plant. The body is in the form of a country cottage, and inside there are two examples of "Delco-Light" sets and a pumping plant which can be operated.

The Effects of Taxation

Presiding at the annual meeting on May 21st of the Industrial and General Trust, Ltd., Sir George A. Touche (chairman), in the course of his speech, said that the past year had produced no sustained recovery from the depth of industrial and business depression reached in the previous year. In many directions affairs were in a worse condition now than 12 months ago. The depression was world-wide, but the clouds gathered in this country sooner than elsewhere and showed fewer signs of lifting. Penal taxation had denuded many enterprises of the reserves and resources required for the expansion of trade and the increase of employment. It had also absorbed free balances which, in normal times, were available for investment abroad. The debtor countries, hitherto able to buy British goods against such credits, had found themselves forced to restrict imports, and many of these countries were financially embarrassed. It had been a time when everything possible should have been done to lighten the burdens on home industry. Instead of this there had been an enormous addition to an already bloated expenditure. The high taxation had prevented or absorbed the savings which ordinarily would have been used to increase production and extend business. This was accomplished formerly, either by ploughing these savings into industry at home or investing them where they would bring in orders from abroad. Home taxation had changed all that and was one of the causes of the world-wide clog on the wheels of trade. During the past year many security values established new bottom records, and over the past two years only one section showed a material rise, namely, electric light and power, where the undeveloped field was still great enough to counteract any business reaction.

Rationalisation

A conference was held in London last week between the Economic Committee of the Trades Union Congress General Council and a committee of the National Confederation of Employers' Organisations. *The Times* reports that the meeting was private but the subject of rationalisation in industry was discussed. The T.U.C. holds the view that in schemes of rationalisation the trade unions should be consulted to ensure that adequate safeguards shall be provided for displaced workers. The policy advocated by the T.U.C. is that the individual unions should seek to safeguard the interests of the workers by compensation for dismissals, and to limit displacements by shorter hours of working and adequate retiring pensions for workers over 60. The more general aspects of the problem and the means of mitigating hardship were discussed at the conference with a view to a joint report and recommendations. In due course, it is expected, a report will be presented for consideration. This conference was the outcome of the recent decision of the T.U.C. and the Employers' Confederation to meet periodically to discuss such matters.

Local Exhibition

A domestic electrical exhibition, arranged by the Electrical Distribution of Yorkshire, Ltd., was held at Hipperholme from May 19th to 22nd. Demonstrations were given of electric cooking, washing, water-heating, and of other domestic electrical apparatus.

Wages in the Cable-Making Industry

The Joint Industrial Council for the Electrical Cable-Making Industry informs us that there will be no "cost-of-living" alteration in wages on the third pay-day in June.

Trade Announcements

The address of the offices of the London branch of the PIRELLI-GENERAL CABLE WORKS, LTD., is now 343/5, Euston Road, London, N.W.1. The telephone number is Museum 9802.

MR. A. W. HAMBLING, A.M.I.R.E., of 104, High Holborn, London, W.C., has acquired the business of the S.O.S. ELECTRICAL CO., electrical and radio engineers, of Weston Road, Southend-on-Sea.

Messrs. R. S. BLACKBURN & CO., of the Ribstone Electric Works, Ribstone Street, Hebden Bridge, announce that they are giving up business. Their electric plant, instruments and stock were disposed of by auction on May 20th.

MR. E. E. FAIRLAMB, radio engineer, of 8, Stone Street, Gravesend, has opened additional premises at 37, Stone Street, as a new department for household electrical goods.

A Novel Bell-push

A neat little bell-push with some unusual features will shortly be placed on the market by the INDICATOR ELECTRIC CO., a new company which is being formed by Mr. A. C. Greig, of 103-5, Moor Park Road, Fulham, London, S.W.6. In the cover, which is made of bakelite, there are two spaces, the top one of which is designed to contain the name of the person to whom the bell refers. In the lower space the words "In" or "Out" can be made to appear by simply turning the push button. If preferred the person's Monomark may be inserted in the lower space.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

	CHEMICALS, &c.	Price May 26th.	Fortnight's inc. or dec.
a	Acid, Oxalic ... ... per lb.	5¾d.	...
a	Ammoniac, Sal ... ... per ton.	£60	...
a	Ammonia, Muriate (large crystal) ,,	£52	...
a	Borax ... ... ,,	£17	...
a	Copper Sulphate ... ... ,,	£25 10s.	...
a	Potash, Chlorate ... ... per lb.	3d. to 4d.	...
a	,, Perchlorate ... ... ,,	5½d.	...
a	Shellac T.N.... ... ... per cwt.	£4 5s.	...
a	Sulphur, Commercial ... ... ,,	£11	...
a	,, Roll ... ... ,,	£11	...
a	Soda, Chlorate ... ... per lb.	3d.	...
a	,, Crystals ... ... per ton.	£5 to £5 5s.	...
a	Sodium Bichromate, casks ... per lb.	3½d.	...
	METALS, &c.		
b	Aluminium, Ingots ... ... per ton.	£85 to £90	...
b	,, Wire ... ... per lb.	1/1 to 1/9	...
b	,, Sheet and Foil ... ,,	1/1 to 2/9	...
b	Babbits Metal and Anti-friction Metals—		
	Grade I ... ... per ton net.	£105	...
	Grade II ... ... ,,	£76	...
	Grade III... ... ... ,,	£46	...
c	Brass (rolled metal 2" to 12" basis) per lb.	7¾d.	½d. dec.
c	,, Tubes (solid drawn) ... ,,	9¼d. to 9½d.	½d. dec.
c	,, Wire, basis ... ... ,,	7¼d.	½d. dec.
c	Copper Tubes (solid drawn) ... ,,	10½d.	½d. dec.
g	,, Bars (best selected) ... per ton.	£73	
g	,, Sheet ... ... ,,	£73	£2 dec.
g	,, Rod ... ... ,,	£73	
d	,, (Electrolytic) Bars ... ,,	£49 12s. 6d.	...
d	,, ,, Sheets ... ,,	£143 10s.	...
d	,, ,, Wire Rods ,,	£59 12s. 6d.	...
d	,, ,, H.C. Wire per lb.	7¼d.	½d. dec.
f	Ebonite Rod ... ... ,,	2/3 to 2/6	...
f	,, Sheet ... ... ,,	2/3 to 2/6	...
n	German Silver Wire ... ... ,,	2/1	...
h	Gutta-percha, fine ... ... ,,	nom	...
h	India-rubber, Para fine ... ... ,,	4¼d.	½d. inc.
i	Iron, Pig (Cleveland No. 3) ... per ton.	58/6	...
l	,, Wire, galve. No. 1, P.O. qual. ,,	£20	...
g	Lead, English pig ... ... ,,	£12 15s.	5s. dec.
g	Mercury ... ... per bot.	£22 7s. 6d. to £22 10s.	...
e	Mica (in original cases) small ... per lb.	6d. to 3/6	...
e	,, ,, medium ,,	4/- to 8/-	...
e	,, ,, large ... ,,	8/6 to 17/6 & up	1/6 to 2/6 dec.
p	Phosphor Bronze, plain castings ,,	1/1½d.	...
p	,, ,, drawn bars & rods ,,	11½d.	...
p	,, ,, rolled strip & sheet ,,	1/0d.	...
p	,, ,, wire ... ... ,,	1/0½d.	½d. dec.
e	Platinum ... ... per oz.	£5 7s. 6d.	12/6 inc.
d	Silicium Bronze Wire ... ... per lb.	9½d.	...
r	Steel, magnet, in bars ... ... ,,	7½d.	...
g	Tin, Block (English) ... ... per ton	£103 5s. to £104 5s.	£2 dec.
n	Wire, Nos. 1 to 16 ... ... per lb.	2/11d.	...

*For 1 cwt. lots. Special quotations against definite specifications.

Quotations supplied by

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd
n P. Ormiston & Sons.
o Johnson, Matthey & Co., Ltd.
p C. Clifford & Son, Ltd.
r W. F. Dennis & Co.

Bankruptcy Proceedings

W. L. SAMES, trading as "The Ladywood Cabinet Company," Thomas Street, West Bromwich, Staffs, wireless parts manufacturer.—The first meeting of creditors was held at the Official Receiver's Office, Birmingham, recently. It was reported that the gross liabilities amounted to £2,404, of which £1,267 was expected to rank for dividend, and there was a deficiency of £2,404. The debtor attributed his failure to an action threatened against him by a limited company for infringement of patent guarantees given on behalf of two limited companies, shortage of capital, and loss on sale of effects by sheriff. He commenced business in partnership in 1923 as manufacturers of radio valves, trading as "The Midland Valve Company" in Birmingham. In the next year a company was promoted and registered as "Midland Valves, Ltd.," with a nominal capital of £100 to take over the business. The debtor was appointed a director, and allotted fifty £1 fully paid shares. At the end of 1924 he resigned his position and disposed of his shares for £5 and commenced business with a partner as wireless accessories dealers, trading as "S.M.F. Electrical Co." The capital of £250 was found by the partner, and in 1925 the business was bought by a company, of which the debtor became manager. The business was unsuccessful, and in 1926 the debtor resigned, and shortly afterwards promoted another company registered as "Octron, Ltd.," for the manufacture of radio valves, the premises being in Charlotte Street. In May, 1927, he left the company and again commenced business as "The British Radio Supplies" as a dealer in valves. He was threatened with an action for infringement of certain patent rights, and after a month closed this business. In November, 1927, he promoted yet another company, known as "The British Sunoline Company, Ltd.," for the manufacture of radio parts, trading at Tenby Street. Whilst with the company the debtor, with others, guaranteed the overdraft at the bank, in respect of which an amount of £692 was outstanding. The company ceased trading in December, 1928, and later the debtor carried on other businesses. The case, being a summary one, was left in the hands of the Official Receiver as trustee.

H. D. SMITH (Standard Radio & Electrical Co.), factor, 4a, Alpha Road, Surbiton, Surrey.—Receiving order made May 14th on a creditor's petition.

A. PARSONS, electrician, 25, High Street, Rotherham.—First meeting held yesterday (Thursday). Public examination, June 25th at the County Court Hall, Bank Street, Sheffield.

J. C. K. BIRKETT, wireless dealer, 1, Scotland Road, Carnforth. Trustee, Mr. H. Parker, Official Receiver, released May 6th.

W. M. HORSFALL, electrical engineer, 7, Redcross Street, Liverpool.—Last day for receiving proofs for dividend, June 3rd. Trustee, Mr. J. Allcorn, Government Buildings, Victoria Street, Liverpool.

W. MANN, wireless dealer, 128, Evington Road, Leicester.—First and final dividend of 1s. 5¼d. in the £ payable May 28th at the Official Receiver's office, Berridge Street, Leicester.

C. W. SANDS, electrical and wireless contractor, High Street, Kings Langley, Hertford.—First and final dividend of 1s. 7¼d. in the £, payable June 2nd at 29, Russell Square, W.C.1.

E. L. PRATT, electrical engineer, 5, Nowell Mount, Harehills, Leeds.—First meeting, June 1st, at the Official Receiver's office, 24, Bond Street, Leeds.—Public examination, June 30th, at the County Court House, Albion Place, Leeds.

A. S. DEACON (London Wireless Co.), 32, London Road, Derby.—Trustee, Mr. F. E. Bendall, Midland Chambers, Corporation Street, Birmingham, appointed May 19th.

H. C. SCHOLES, electrician, 37, Albany Road, Chislehurst.—Last day for receiving proofs for dividend, June 15th. Trustee, Mr. C. J. Pyke, 280a, High Street, Rochester, Official Receiver.

Company Liquidations

A. CUNNINGHAM & CO. (MANCHESTER), LTD.—Winding up voluntarily. Liquidator, Mr. F. Dook, 37, Cross Street, Manchester.

The CHATTERIS ENGINEERING CO., LTD.—Winding up voluntarily. Liquidator, Mr. W. Driscoll, 19, Clarence Road, Croydon.

SELECTORS, LTD.—Winding up voluntarily. Liquidator, Mr. W. R. Sharp, 11, Waterloo Place, London, S.W.

METROPOLITAN-VICKERS ELECTRICAL CO. (MEDITERRANEAN) LTD.—Meeting, June 23rd, at 5, London Wall Buildings, E.C.2, to receive an account of the winding up by the liquidator, Mr. A. Rae Smith.

ELECTRICITY (HULL), LTD.—Meeting, June 24th, at Angloco House, George Street, Hull, to receive an account of the winding up by the liquidator, Mr. R. Verity.

ENTERPRISE MANUFACTURING CO., LTD.—First meeting of creditors June 5th at Carey Street, W.C.2. Proofs to be sent to the liquidator, Mr. G. D. Pepys, Senior Official Receiver and Liquidator, Carey Street, by June 3rd.

Winding-up Petitions

ELECTRICAL & RADIO PRODUCTS, LTD.—A petition for the winding up of this company has been presented to the High Court by Henrion Carbons, Ltd., and will be heard in London on June 8th.

ADEY RADIO, LTD.—A petition for the winding up has been presented to the High Court by Messrs. W. H. Smith & Son, Ltd., and will be heard in London on June 8th.

Electricity Supply

Lighting, Domestic, Power

Algeria. — DISTRIBUTION SCHEME. — The Société d'Intérêt Collectif Agricole d'Electrification, of Mascara, has just invited schemes for the establishment of a h.p. and l.p. power distribution system in the district. It is estimated that apart from the copper conductors, the work will involve an expenditure of about £60,000.

Aylesbury.—LOANS.—The Town Council has received sanction to a loan of £15,000 for mains and services. Sanction to a loan of £5,000 for meters has also been applied for.

Barnes.—NEW CABLE.—In order to provide for additional demands and to improve the efficiency of distribution, the Urban District Council has decided to relay the feeder cable at River View Gardens at an estimated cost of £1,250.

Blackburn.—YEAR'S WORKING.—The second annual report of Blackburn's new electrical engineer, Mr. W. A. Royle, shows continued saving in expenditure. The loss on the year of £5,874 is due entirely to the reduced output of the undertaking on account of bad trade. Revenue expenditure decreased from £76,498 to £69,112. The main saving was in the cost of generation, the figures for 1930 and 1931 being £36,514 and £29,504 respectively. Revenue declined by £15,903, but the domestic load sales advanced by £3,240. A reduction in the charge to the tramways from 1¾d. to 1¼d. per kWh was responsible for a loss to the Department of £5,038. The heaviest fall in revenue was on the industrial load due to depressed industrial conditions. The gross profit on the year's working was £127,931. Interest, tax, and debt repayment amounted to £133,805, leaving a deficiency of £5,874. Last year the gross profit was £132,907 and the loss on the year was £2,286. This year renewals, capital expenditure out of income, and provision for depreciation amounted to £8,174, making a total deficiency of £14,048, as compared with £30,958 last year.

Broadstairs.—ELECTRICITY COMPANY'S OFFER.—The Isle of Thanet Electric Supply Co., Ltd., has made an offer to the Urban District Council for an extension of the deed of transfer of the electricity undertaking until January 1st, 1970. It is proposed that the undertaking should be transferred to the Council free of cost so far as existing assets are concerned, and at cost, less depreciation for additional assets purchased between January 1st, 1931, and January 1st, 1970, subject to the net revenue during that period being sufficient to provide a sinking fund to redeem the capital expenditure, and interest at 7 per cent. per annum on the capital employed. The maximum tariff would also be reduced from 8d. to 6d. per kWh.

Similar terms have been offered to the Margate Town Council. The matter is being considered by a special sub-committee in conference with the Parliamentary agents and consulting accountants.

Burley (Hants.).—INAUGURATION OF SUPPLY.—A supply of electricity provided by the West Hampshire Electricity Co., Ltd., was inaugurated on May 20th. Demonstrations of modern electrical appliances were given in the Parish Hall.

Bury St. Edmunds.—BULK SUPPLY.—The Town Council has arranged terms with the Central Electricity Board for a bulk supply of electricity.

Canada.—HYDRO-ELECTRIC DEVELOPMENT IN SASKATCHEWAN.—The Manitoba Legislature has voted the sum of $12,000 to be spent on the investigation and survey of the scheme for the development of hydro-electric power from the Saskatchewan River, described by the Premier (Hon. John Bracken) in his recent Budget speech. The plan contemplates the diversion of the River Saskatchewan into Lakes Winnipegosis and Manitoba, the water flowing thence through the Dauphin River in Lake Winnipeg, at a point 140 miles from the city of Winnipeg. The cutting of a channel from the Assiniboine River near Portage la Prairie to the southern end of Lake Manitoba is a supplementary scheme. It is expected that 400,000 h.p. of electrical energy could be developed for use in Winnipeg and in western Manitoba cities and towns.

CHUTE-A-CARON PLANT NEARING COMPLETION.—One of the largest hydro-electric plants in Canada, that of the Alcoa Power Company at Chute-à-Caron on the Saguenay River in Quebec, is now nearing completion. Two of the water-wheel generator units have been installed, and two more are in process of installation. These generators, among the largest in the world, are normally rated at 65,000 h.p. each, but they will actually be capable of producing 77,000 h.p. The Chute-à-Caron installation has been undertaken to provide electric power for the large aluminium industry established some years back at the nearby town of Arvida where the Aluminium Company of Canada requires huge quantities of energy. The present scheme is the first stage in a two-stage development of the water power available on the Saguenay River at this point. Ultimately, when the contemplated Shipshaw plant has been erected, two miles lower down the river, a total of one million h.p. will be developed.

THE BEAUHARNOIS POWER SCHEME.—An investigation is to be held by a Parliamentary Committee into the Beauharnois power development scheme, according to an announcement made last week in the Dominion House of Commons by the Prime Minister, Mr. Bennett. This announcement was the sequel to a speech by Mr. Robert Gardiner, leader of the United Farmers' Party of Alberta, in which he severely criticised the Beauharnois project, claiming that the company, by constructing the Beauharnois canal, had infringed the terms of the Order-in-Council authorising power development, and that the people of Canada were being unjustly deprived of a great part of the national domain. The Prime Minister agreed with Mr. Gardiner that the construction of the canal by the company was not in accordance with the Order-in-Council, and he therefore invited suggestions from Mr. Gardiner with regard to the scope of reference to the proposed committee of investigation. The Beauharnois Power Co. is developing 500,000 h.p. of hydro-electric energy on the St. Lawrence river at a spot some 30 miles west of Montreal, and is also constructing a canal about 15 miles long between Lake St. Francis and Lake St. Louis on the St. Lawrence.—*Reuter* (Ottawa).

Chippenham.—EXTENSIONS.—The West Wilts Electric Light and Power Co., Ltd., has informed the Rural District Council of its intention to give a public supply of electricity to Sutton Benger by next winter. The Council has given the company permission to install electric lighting in Council houses under agreements with the tenants.

Clitheroe.—LARGE INCREASE IN ELECTRICITY CONSUMPTION.—It was stated at a recent meeting of the Town Council that in the past year there had been an increase of 62 per cent. in the consumption of electricity.

LOAN.—The Corporation intends to make application for sanction to a loan of £6,000 in connection with the electricity scheme.

Congleton.—ASSISTED WIRING SCHEME.—The Town Council has decided to proceed forthwith with an assisted wiring scheme for houses. There is to be an additional charge of 2d. per kWh until the cost of wiring is discharged.

Dorchester (Oxon).—ELECTRICITY SCHEME WITHDRAWN.—The Wallingford and District Electric Light Supply Co., Ltd., has intimated that owing to opposition to the erection of overhead lines the scheme to supply electricity to the parish has had to be withdrawn. The opposition comes from the Rural District Council, the Oxfordshire County Council, and the South Oxfordshire Town Planning Committee.

Dunmow.—ELECTRICITY SUPPLY NEXT AUTUMN.—The County of London Electric Supply Co., Ltd., has informed the Rural District Council of its intention to commence the construction of electricity works at Dunmow, and it is anticipated that a supply will be available next autumn.

East Ham.—SWITCHGEAR.—The Town Council has received sanction to a loan of £7,288 for switchgear in connection with the bulk supply from the Central Electricity Board.

Gainsborough.—LOAN.—The Urban District Council has received sanction to a loan of £4,000 for improving the electricity supply.

Hornsey.—LOAN SANCTIONED.—The Corporation Electricity Committee has obtained sanction to a loan of £30,000 for mains and services.

Isle of Man. — THE ELECTRICITY BILL. — According to the *Liverpool Post*, the dispute between the House of Keys and the Governor on the Electricity Bill has been settled. The Keys threatened to refuse to pass any taxation this year unless the Governor would agree with its decision that the island's electricity supply should be under the control of a non-profit-earning company. The dispute arose over a Bill promoted by a private company. The House of Keys discharged the Bill, and asked that the Governor should have a measure prepared entrusting the supply to a Government Board. The Governor refused to do this, stating that the present financial condition of the island did not justify the expenditure involved. It was stated in the House last week that the Governor's attitude had been misunderstood, but that if the House thought its recommendation should be proceeded with he would gladly carry out its request. After discussion, the House repeated its request, and the Governor promised to have a Bill prepared. The new Bill will not be ready until next winter.

WIRING SCHEME.—Preparations are being made by the Douglas borough electrical engineer to popularise an electric wiring scheme for which borrowing powers for £1,500 are now being sought. In the Corporation's area of supply there are 2,800 properties rated at £25 or under and of these only 800 are wired. Only tenants of houses of a rateable value of less than £25 will be able to avail themselves of the scheme and it is estimated that the installations will cost about £10 or £11 for ten points.

LOAN.—The Douglas Corporation is also proposing to apply for sanction to a loan of £10,000 to cover the estimated annual capital expenditure on mains, services, meters and cookers.

Kendal.—REQUEST FOR SUPPLIES.—A request has been received for a supply of electricity to premises at East Bank, Ash Meadows, Crescent Green, and Mint Street. The Town Council has replied that a supply cannot be given unless there is a guarantee of £200 per annum for a period of three years.

Kilconquhar (Fifeshire).—STREET LIGHTING.—The local committee of the County Council has approached the Fife Electric Supply Co. with regard to lighting the streets of Kilconquhar by electricity.

Kingston-on-Thames. — MAINS EXTENSIONS. — The Town Council has applied for a loan of £1,000 for mains extensions.

Lichfield.—MAINS EXTENSIONS.—If financial assistance is obtained from the Unemployment Grants Committee the City Council is to extend mains to Shenstone Wood End, where electric motors for sewage pumping are to be installed by the Rural District Council at an estimated cost of £1,245.

Liverpool.—SPECIAL ORDER.—The Corporation has applied to the Electricity Commissioners for a Special Order authorising it to extend its electricity supply area so as to include the parishes of Aughton, Lydiate, and Maghull.

Lochaber.—SECOND STAGE OF SCHEME COMMENCED.—A commencement has now been made with the second section of the British Aluminium Company's Lochaber power scheme, comprising the construction of an aqueduct in the tunnel between Loch Laggan and Loch Treig and a dam at the end of the latter to permit of the loch being raised by a height of about 36 ft. The raising of this water level will necessitate a diversion of 1½ miles of the L. & N.E.R. West Highland line at the north end of the loch, and this work is now in hand.

London.—HAMMERSMITH.—The Borough Council Electricity Committee recommends that, as from May 20th, 1931, electricity consumers under the assisted-wiring scheme shall be given the option of paying, in substitution for quarterly hire rentals, 6d. per kWh consumed through prepayment meters, this charge to include both the hire rentals of their installations and the cost of the electricity consumed.

BERMONDSEY.—The Borough Council is applying for sanction to loans of £25,000 for mains, £20,000 for installations, £10,000 for meters, and £2,000 for apparatus.

Lowestoft.—LOAN.—The Town Council has applied for sanction to a loan of £3,750 for h.p. mains, overhead and underground cables, kiosks and transformers.

Morecambe.—SUB-STATION SWITCHGEAR.—At a recent meeting of the Corporation Electricity Committee the electrical engineer reported that the estimated cost of the sub-station switchgear required at Torrisholme, including the provision for a proposed new feeder and dismantling of the existing switchgear, would be £1,700. The Committee decided to apply for sanction to borrow the amount.

Northern Ireland.—LURGAN.—During the past twelve months the Urban District Council Electricity Department generated 663,746 kWh of electricity, as compared with 588,276 kWh in the preceding year. The revenue from the undertaking showed an increase of over £1,000 and 154 new consumers were connected.

Preston.—ANNUAL INSPECTION OF UNDERTAKING.—Members of the Town Council last week made their annual inspection of the Preston electricity undertaking. Councillor Rhodes, chairman of the Electricity Committee, in a review of the progress of the undertaking said that in Preston the consumption had increased from 30 million to 32 million kWh and at Blackpool the increase had been from 30 million to 39 million kWh. Income had increased from £256,000 to £303,000 and expenditure for generation and other purposes from £130,000 to £144,000. The gross surplus was £159,000 as against £126,000 in the previous year. The net result was that their balance had increased from £7,000 in 1929-30 to £16,000 in 1930-31. During the year they had laid 60 miles of mains, overhead and underground, their present length of mains now standing at 335 miles with a possible further extension of 100 miles. The domestic load still continued to grow and the number of consumers connected during the year had increased by 3,000, making a total of 17,500. Seventy-six poultry farms took supplies and there was every possibility of further growth in this direction.

Price Reductions.—Reductions in the charges for electricity have been made or recommended in the following districts:—

MIRFIELD.—Lighting: From 5d. to 4d. per kWh, with a discount of 5 per cent. Prepayment meter lighting: To 4½d. per kWh. Power and domestic heating: From 1½d. to 1¼d. per kWh, with a discount of 2½ per cent.

THORNTON-CLEVELEYS.—Heating and cooking: Over 1,000 kWh per quarter, ¾d. per kWh. Shop window lighting after 8 p.m.: 1d. per kWh.

MERTHYR TYDFIL.—Lighting: First 100 kWh per quarter 7d. per kWh; beyond, 6d. per kWh. Cooking, heating, and domestic supplies: 2d. per kWh for the first 100 kWh per quarter with a reduction from 1½d. to 1¼d. per kWh beyond. Where consumers use an electric cooker of 5-kW capacity or over, the secondary charge is to be 1d. per kWh.

MOUNTAIN ASH.—Lighting flat rate: 2¾d. per kWh. Heating and cooking: First 500 kWh. per quarter, 1d. per kWh; beyond, 0.9d. per kWh. Assisted wiring, prepayment meter supply: 5d. per kWh for the first 5½ years, and 2¾d. per kWh thereafter.

Rufford.—INAUGURATION OF SUPPLY.—A supply of electricity, afforded under the scheme of the West Lancashire Rural District Council, was inaugurated recently. The Council now supplies electricity to six townships within its area, the next districts to be given a supply being Bescar Lane, Scarisbrick and Halsall.

Stoke Poges.—OPPOSITION TO OVERHEAD LINES.—The Stoke Poges and Burnham Parish Councils have written to the Eton Rural District Council complaining of the Central Electricity Board's proposal to erect overhead lines through Stoke Poges. An alternative route has been suggested and a delegation is to be sent to meet representatives of the Board.

Tynemouth.—HIRE-PURCHASE OF ELECTRIC IRONS.—The Corporation Electricity Committee has decided that in future electric irons shall be supplied to consumers on assisted-wiring terms (if desired), and that existing hirers of electric irons under hire-purchase agreements shall be given the opportunity of adopting the assisted-wiring terms for payment of the balances due from them.

United States.—GENERATION OF ELECTRICITY.—During the first three months of the year the electricity generated by public utility power plants in the United States amounted to 22,965,000,000 kWh, as compared with 24,477,000,000 kWh in the corresponding period of the preceding year, a decrease of approximately 6 per cent.

Wakefield.—REWIRING OF COUNTY HALL.—The West Riding County Council is to rewire the County Hall and offices at a cost of £1,250.

Walton-on-Thames.—IMPROVEMENT OF SUPPLY.—The Urban District Council has adopted a scheme for improving the pressure of the supply at an estimated cost of £21,100.

Traction

Continental.—ITALY.—According to *Modern Transport*, a stretch of line, 79 miles long, between Savonia and Ventimiglia, is to be opened for electric traction shortly. This will complete the entire electrification of the line between Genoa and Ventimiglia, with a considerable saving in travelling time between these two cities. Details have also been published of a proposed electric railway, 25 miles long, between Arezzio and Sinalunga.

SWITZERLAND.—According to a report issued recently by the Union of Swiss Banks, a total of £27,176,000 has so far been expended by the Swiss Federal Railway authorities on railway electrification in the country. Of the total, £6,144,000 has been spent on power stations, £4,756,000 on contact lines, £2,964,000 on l.p. apparatus, £1,704,000 on transformer stations, £1,628,000 on transmission lines, and £9,980,000 on electrical rolling stock.

Great Western Railway.—AUTOMATIC TRAIN CONTROL.—The Great Western Railway Co. announces that the whole of its main line route from Paddington to Plymouth, by way of Westbury or Bristol, has now been brought under the automatic control system, which is being installed on all the company's main lines. The system, which is foolproof, gives audible warning to the driver in the cab of the state of the signals, and in the event of a "danger" or "distant" signal being passed, automatically stops the train before it reaches the next signal. The company hopes to complete the installation on other routes by the end of the year, at a total cost of £250,000.

Sunderland.—NEW TRAMCAR.—A new tramcar of the new 60-seat double-deck type with upholstered seats on the lower deck has been introduced by the Corporation on to the Sea Lane-Grangetown route.

Trolley 'Buses.—One of the latest six-wheel electric trolley 'buses to appear on the British market is the Brush-Thornycroft, the chassis of which is constructed by John I. Thornycroft & Co., Ltd., and incorporates their patented system of rear bogie suspension whereby the weight is distributed equally between the four driving wheels. The Brush Electrical Engineering Co., Ltd., is responsible for the electrical equipment of the vehicle, which includes a single trolley-'bus type motor, centrally mounted towards the forward end of the frame, and B.T.-H. foot-operated control gear embodying electric rheostatic brakes. The master controller is pedal-operated, leaving the driver's hands free for steering and applying the hand brake. The bases of the trolley poles are carried on a specially-constructed platform supported independently of the roof of the vehicle. The trolleys are mounted on Timken roller bearings, and an indicator is provided to show when they leave the wires.

United States.—RAILWAY ELECTRIFICATION.—According to the New York correspondent of the *Daily Mail*, there are now approximately 4,000 miles of electrified tracks in the large railroad systems. The longest installation at present in operation is that of the Chicago, Milwaukee, St. Paul and Pacific Railroad, covering nearly 1,000 miles of permanent way in the States of Montana and Idaho, over four mountain ranges. The electric system of this railroad will, however, shortly be exceeded by that of the Pennsylvania Railroad, which is expending £37,000,000 on a programme embracing the whole route between New York and Washington (some 200 miles). When this programme is completed the Pennsylvania will have 1,300 miles of electrified tracks. It is probable too that in the near future the Baltimore and Ohio (which now controls the Reading Company, which in its turn controls the Central of New Jersey) may parallel the Pennsylvania scheme by electrifying its lines between New York and Washington. Among many other projects are: Reading Company, 160 miles; Lackawanna, 160 miles; Cleveland Union Terminal, 56 miles; Great Northern, 93 miles; and Virginian, 230 miles.

Wallasey.—RAILLESS CARS.—The House of Commons Select Committee on Unopposed Bills last week considered the Bill promoted in Parliament to confirm a Provisional Order made by the Minister of Transport with regard to the Corporation's railless-car scheme. The Order provides for the operation of railless cars on fifteen routes and for the borrowing of sums amounting to approximately £180,000 for the purchase of vehicles, &c.

Telegraph and Telephone

Australia.—MERGER HITCH.—The Federal Government has refused to ratify the agreement between Amalgamated Wireless (Australia), Ltd., and Imperial Communications, Ltd. The announcement was made by the Postmaster-General, and the reason given was that the merger was opposed to the Ministry's policy of nationalisation of the great public utilities.

OVERSEAS TELEPHONY.—Since the first overseas telephone service was opened in April last year 1,362 calls have been dealt with. Most of them were between Australia and Great Britain, although many were made between Australia and New Zealand. The United States, France, Germany, and Switzerland follow in order of business done. By the overseas service, telephone subscribers in Australia may now speak to any one of about 30,000,000 subscribers in all parts of the world.

Belgium.—RADIO-TELEGRAPHY.—Direct radio-telegraph communication has just been established between Brussels and Buenos Aires.

Brazil.—RADIO-TELEPHONY.—A direct radio-telephone service was inaugurated on May 21st between all parts of Great Britain and Northern Ireland and Rio de Janeiro, Brazil.

France.—AUTOMATIC TELEPHONY.—The inauguration of the Passy exchange, the eleventh Paris exchange to be transformed from manual to automatic operation, brings the number of dial subscribers in the French capital to 60,000, about one-third of the total number.—*Reuter* (Paris).

International Telephony.—GERMANY.—Among the extensions of long-distance telephony which the German Post and Telegraph Department has in hand for the present year are a line between Leipzig, Chemnitz, Karlsbad, and Cosel on the one side and Prague, Czecho-Slovakia, on the other, a connection with Poland by the Gleiwitz-Kattowitz line and a connection between Dusseldorf and Venlo, Holland.

ANGLO-BELGIAN CABLE.—The British Government is in negotiation with Belgium for the laying of a new telephone cable between St. Margaret's, in England, and La Panne, in Belgium. The British authorities foresee a considerable extension of traffic with the Continent, and wish to provide circuits for such distant countries as Turkey, Bulgaria, and Rumania. Amplifying stations will be erected on both the British and Belgian coasts and the cost will be shared by the two countries. According to present plans, the cable will be laid in 1932, and be put into service at the beginning of 1933.

ANGLO-RUMANIAN SERVICE.—A service is now in operation between this country and Rumania. Communication is available from all parts of Great Britain and Northern Ireland, but is restricted initially to certain towns in Rumania, including Bucharest, Braila, Constanta, Galatz, Oradea Mare, and Timisoara. The service will be extended as soon as conditions permit and subscription calls, at half the day charges, may be obtained between 7 p.m. and 8 a.m.

Italy.—TELEPHONY.—The number of telephone subscribers in Italy has nearly doubled in the past five years. There are now 290,000 subscribers, as compared with 150,000 in 1925.

Railway Telephony.—CARRIER SYSTEM.—What is believed to be the first system of carrier telephony to be introduced on a railway in Great Britain is now being installed on the main line of the London & North-Eastern Railway between York and Newcastle-on-Tyne says *Modern Transport*. There are already several phantom circuits and the limit in this respect had been reached, so that to provide an additional circuit would have involved the erection of an extra pair of wires, which would have been costly. Further, owing to the circuit being required for the use of traders, it was considered essential that it should be, in every respect, a private circuit. This precluded any existing circuit being made use of for the purpose, and a carrier-wave circuit is, therefore, now being installed by the General Electric Co., Ltd. Incidentally, the Post Office has granted permission for traders in the Newcastle area to use the new circuit to York, a switching arrangement being employed in the district goods office at Newcastle for this purpose.

Radio

Australia.—LICENCES.—During March the licence increase for the Commonwealth, as compared with the end of February, was 1,161, of which 688 was in New South Wales. The tendency in Victoria was still downward, the decrease for the past month being 119, but there were 139,020 licensed listeners in that State, being 7.76 per 100 of population, compared with 119,659 in New South Wales, equal to 4.79 per 100 of population. The increases for the other states during March were: Queensland, 51; South Australia, 314; Western Australia, 160; and Tasmania, 67. Whilst 4,816 persons cancelled their licences during last month, 5,977 took out new licences. The upward tendency is steady in the States with the smaller and more scattered populations. The percentage per 100 of population is 4.95 in South Australia, 2.57 in Queensland, 3.58 in Tasmania, and 2.01 in Western Australia. Taking the Commonwealth as a whole there are now 15,973 more licences in existence than at the end of June, 1930, the figures being: June, 1930, 312,192, and at the end of last month, 328,165. In that period the number in New South Wales increased a little over 8,000, whilst the net decrease in Victoria was about 1,000.

B.B.C. Finance.—1930 INCOME.—A plea for more money is made by the Governors of the B.B.C. in their annual report for 1930, during which year the income was £1,224,355, of which £580,303 was spent on programmes, but the Governors say that the receipts are insufficient for normal development. Under existing arrangements the greater the number of licences the smaller the percentage paid to the Corporation: in respect of licences over three million, this amounts to only 52 per cent. of the gross revenue, and is paid in arrear.

Last year the number of 10s. licences rose to 3,411,910, an increase of 455,174; the increase during 1929 was only 328,344. The Post Office takes the first shilling of every licence, and after that a percentage of the remainder, on a sliding scale. It takes 40 per cent. of the remaining nine shillings out of every licence in excess of three millions. During the year there were 72,396 hours of broadcasting by all the transmitters, and the percentage of breakdown time was only .04, or 82 minutes breakdown a transmitter a year. In 1929, with 6,000 fewer hours of broadcasting, the percentage was .05. It is believed that 5,260 schools followed the school broadcasts during the year, while the B.B.C. knows for a fact that 2,356 schools followed the course day by day. Some 1,845,121 pamphlets were issued. Of the B.B.C.'s total income, £192,720 was spent on the engineering side, and £59,420 on administration. The balance carried down was £186,002.

Compared with 1929, £31,627 more was spent on the programmes. The gross receipts from licences amounted to £1,696,000, but the B.B.C. received only £1,043,000, the remaining £635,000 being shared between the Post Office and the Treasury.

Canada.—CONTROL.—Radio has presented Canada with a constitutional problem, namely, whether its control and regulation comes within the jurisdiction of the Dominion or the provinces. For three days counsel dealt with the intricacies of the question before the Supreme Court of Canada, and at the conclusion of the argument judgment was reserved. A wide range of subjects was traversed during the hearing. The case involved primarily the interpretation of those sections of the British North America Act which defines the scope of governmental authority between the provinces and the Dominion, but also embraced discussion of such technical matters as the nature of radio waves and the uses to which radio is put now or may be directed in future. Up to the present the Dominion Parliament has assumed control, and has entered into international treaties and agreements respecting the allocation of wave-lengths. It has enacted a law prohibiting the operation of a radio receiving set without a licence. The province of Quebec challenged the Dominion's right to control broadcasting, and the Dominion Government referred the question to the Supreme Court of Canada. Ontario and New Brunswick generally supported the contention of Quebec.—*Reuter* (Ottawa).

Denmark.—INTERNATIONAL CONGRESS.—From May 27th to June 8th there will be held in Copenhagen a meeting of the International Consultative Technical Committee for Radio Communications, better known as the C.C.I. (R.), consisting of members of the various postal, telegraph, and telephone administrations. Among other matters the congress will discuss the wavebands best suited to the particular needs of the various radio services.

France.—NEW STATION.—The new station at Pontoise, constructed with the object of providing the French colonies with news, will shortly be transmitting regularly on a wavelength of from 19 m. to 25 m. It has a power of about 13 kW, three masts, and two transmitters which are stabilised by crystals and will work separately or simultaneously. There is a special auditorium at the Colonial Exhibition, and at the moment it is being announced as "Poste C 12,000."

Tramway Interference.—ALLEVIATION.—The May (No. 341) issue of the Tramways, Light Railways and Transport *Journal* contains a record of the attempts being made by the Post Office Engineering Department and the Association to reduce the interference of trolley-'bus and tramways systems with radio reception, together with a list of towns where steps have been, and are being, taken to modify the traction systems with that end in view.

U.S.A.—HOTEL INSTALLATION.—The Waldorf Astoria Hotel in New York has one of the largest radio receiving installations in the world. In each of the 2,000 rooms one can listen to any one of six programmes simply at the turn of a switch. In addition to radio, tea-time and dance music is relayed from the hotel ballroom, while guests can, if they wish, switch on to the musical sections of the sound films shown in the hotel kinema. Radio "fans" are catered for by 150 rooms, each of which is fitted with a set connected to a common aerial above the hotel at a height of nearly 600 feet.

Yugo-Slavia.—According to Dr. Milan Stojadinovich, president of the A.D., Belgrade, writing in the *Manchester Guardian Commercial*, Yugo-Slavia's first station was erected in 1926 at Zagreb, and had a power of half a kilowatt. Ljubljana followed in 1928 with a 2½-kilowatt set, but Belgrade did not start its activities until the end of March, 1929, with modern Marconi 2.8-kilowatt equipment. These three stations are at present the only ones operating and there are about 42,000 subscribers; 27,000 are served by Belgrade and 8,000 and 7,000 by Zagreb and Ljubljana, respectively. The number of non-paying listeners can be taken as 20,000, most of them in Belgrade. There is, therefore, a market of at least 62,000 customers, and it is increasing monthly by 2,000 to 3,000. There is not much production of wireless equipment in the country itself.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Abergele (NORTH WALES).—June 4th. Manchester Public Health Committee. Automatic telephone system at the Corporation's new Children's Sanatorium. Specification (deposit £1 1s.) and form of tender from city architect, Town Hall, Manchester.

Australia.—SYDNEY (N.S.W.).—Government Railways. One 2,500-kW alternator for Lithgow power station. The date for the reception of tenders has been extended from April 8th to July 8th. (A. 10904.)*

Ballinasloe.—June 8th. Committee of Management. Complete electrical installation at the Ballinasloe Mental Hospital. Specifications (deposit £3 3s.) from J. P. Turner & Son, consulting engineers, 44, Kildare Street, Dublin.

Bridlington.—June 10th. Corporation. Conversion of distribution system from d.c. to a.c. (May 22nd.)

Cheadle and Gatley.—June 9th. Electricity Department. 125-kVA transformer kiosk. (May 22nd.)

Chile.—SANTIAGO.—June 30th. State Supplies Department. Electric wire. (C.X. 3550.)*

Coseley (STAFFS.).—June 15th. Education Committee. Installation of electric lighting in five schools. (May 22nd.)

Dingwall (ROSS).—June 6th. County Council. Works, including electric lighting and heating, at new Academy. Schedules (deposit £2 2s.) from Mr. Matheson, architect, Dingwall.

Egypt.—CAIRO.—July 5th. Ministry of the Interior. Pumping equipment, installation of telephone system, &c., at Damietta. (G.X. 10369.)*

July 6th. 380 steel tubular poles, 2,000 kilos of bare copper wire, junction boxes and 695 meters. (A.X. 10907.)*

July 11th. Electric power station at Mansourah, including Diesel-driven alternators, switchgear, transformers, pumping sets, and a 40-ton crane. (A.X. 10910.)*

June 15th. Ministry of Public Works. Electrically-driven pumping plant for El Arisk. (G.X. 10370.)*

Harrogate.—June 1st. West Riding Public Health and Housing Committee. Electrical wiring at the West Riding Tuberculosis Dispensary, 10, North Parade. Particulars from county architect, Wakefield.

Hull.—Corporation Telephone Committee. Automatic table telephones. (May 15th.)

Lancaster.—Electricity Department. Overhead line between Halton and Caton. (May 22nd.)

London.—CENTRAL ELECTRICITY BOARD.—June 22nd. Site works, foundation works, buildings and cable bridge at Stockport and Bolton for the North-West England and North Wales Electricity Scheme. (May 22nd.)

HAMMERSMITH.—Borough Council. Wiring for heating, cooking and water-heating in flats on Southern housing estate. (May 22nd.)

OFFICE OF WORKS.—June 2nd. Electrical accessories. (May 22nd.)

LONDON COUNTY COUNCIL.—June 15th. Wiring and fittings in two ward blocks at the Eastern Hospital, Homerton Grove, E.9. (See this issue.)

June 17th. Cables in connection with the installation of new ventilating plant at Rotherhithe Tunnel. (See this issue.)

June 22nd. Static transformers with e.h.p. and l.p. switchgear at Greenwich power station. (See this issue.)

Morecambe and Heysham.—Electricity Department. Overhead line between Heysham and the villages of Middleton and Overton; also pole transformers, switchgear and l.p. distribution system in above villages. (See this issue.)

North-West Midlands.—Joint Electricity Authority. Steam raising fuel, painting work, &c. (May 15th.)

Nottingham.—June 9th. Electricity Department. General stores. (May 22nd.)

Siam.—July 31st. Post and Telegraph Department. Armoured underground telephone cables. (A. 10928.)*

Silsden (YORKS.).—Installation of electric lighting at Hothfield Street Council School. Tenders to Mr. C. E. Bailey, divisional clerk, Education Office, Skipton.

South Africa.—JOHANNESBURG.—June 29th. Two electrically-driven traversers and eight trailers. (G.X. 10416.)*

Thorne (NR. DONCASTER).—June 6th. Electric lighting at police station and petty sessions room. Particulars from the West Riding architect, County Hall, Wakefield.

Uruguay.—MONTEVIDEO.—June 18th. State Electricity Works. Electrical accessories, including fuse wire, porcelain insulators and supports, lever switches, rotary switches, cut-outs, plugs and sockets, seamless steel conduit, ebonite tubing and lampholders. (A.X. 10908.)*

Warrington.—June 1st. Electricity Department. E.h.p. substation switchgear. (May 22nd.)

Watford.—June 18th. Corporation. Electrical heating plant for swimming and slipper baths. (May 22nd.)

West Midlands.—June 1st. Joint Electricity Authority. Substation transformers. (May 15th.)

June 10th. Cable work for Ironbridge generating station. (May 22nd.)

*Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Barking.—The Victoria Electrical Co. has received the contract for electrical work at Gascoigne Road school.

Bedford.—Watch Committee. Recommended:—
Traffic signals.—Barber & Colman, Ltd.

Falkirk.—Corporation. Accepted:—
Electrical work at Blinkbonny housing scheme.—J. Livingstone & Co.

Government Contracts.—The following contracts were placed by the various Government Departments during April:—

ADMIRALTY (CONTRACT AND PURCHASE DEPARTMENT).
Electric cable.—General Electric Co., Ltd.; Siemens Brothers and Co., Ltd.; St. Helens Cable & Rubber Co., Ltd.

WAR OFFICE.
Generators.—Small Electric Motors, Ltd.

AIR MINISTRY.
Electric cable.—Ward & Goldstone, Ltd.
Electric fans.—General Electric Co., Ltd.
Wireless valves.—Edison Swan Electric Co., Ltd.

CROWN AGENTS FOR THE COLONIES.
Cable.—British Insulated Cables, Ltd.; Callender's Cable and Construction Co., Ltd.; Siemens Bros. & Co., Ltd.
Electrical materials.—General Electric Co., Ltd.
Meters.—Ferranti, Ltd.
Static transformers.—Brush Electrical Engineering Co., Ltd.
Steel poles.—British Mannesmann Tube Co., Ltd.
Switchgear.—English Electric Co., Ltd.

POST OFFICE.
Protective apparatus.—Automatic Telephone Manufacturing Co., Ltd.; Phœnix Telephone & Electric Works, Ltd.; Power Equipment Co., Ltd.

Telephonic apparatus.—Ericsson Telephones, Ltd.; General Electric Co., Ltd.; Siemens Brothers & Co., Ltd.; Standard Telephones & Cables, Ltd.; Telephone Manufacturing Co. (1929), Ltd.

Cable.—British Insulated Cables, Ltd.; Connolly's (Blackley), Ltd.; General Electric Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Pirelli-General Cable Works, Ltd.; Siemens Brothers & Co., Ltd.; Standard Telephones & Cables, Ltd.; St. Helens Cable & Rubber Co., Ltd.

Ebonite cases.—India Rubber, Gutta Percha & Telegraph Works Co., Ltd.

Loading coils.—Siemens Brothers & Co., Ltd.; Standard Telephones & Cables, Ltd.

Insulators.—Bullers, Ltd.
Electric motors.—Normand Electrical Co., Ltd.
Rectifiers.—Edison Swan Electric Co., Ltd.

Manufacture, supply, drawing-in and jointing of cable.—Siemens Brothers & Co., Ltd.

Telephone exchange equipment.—Courage & Co., Ltd. (London, S.E.); Hunslet, Horsforth & Adel (Leeds multi-exchange area); Northwood (Middlesex); Churston (Torquay multi-exchange area); Automatic Telephone Manufacturing Co., Ltd. Kilmarnock; Gibbet Hill (Coventry multi-exchange area); Pinhoe (Exeter multi-exchange area); General Electric Co., Ltd. Corstorphine (Edinburgh multi-exchange area); Portslade (Brighton multi-exchange area); Broadwell, Halesowen and Blackheath (Birmingham area); Middleton (Manchester area); Uxbridge (Middlesex); Siemens Brothers and Co., Ltd. Stone Cross and Tipton (Birmingham area); Ericsson Telephones, Ltd. Pinner: Standard Telephones & Cables, Ltd.

Telephonic repeater equipment.—General Electric Co., Ltd.
Transformers, e.h.p. oil switch-fuse units, &c., Bayswater Telephone Exchange.—Drake & Gorham, Ltd.

Lamp Contracts.—A contract has been placed with Siemens Electric Lamps & Supplies, Ltd., by the Air Ministry, for a supply of all types of Siemens electric lamps.

The company has received an order from Epsom Urban District Council for 12 months' supply of electric lamps.

Manchester.—Electricity Committee. Recommended:—
Laying 33,000-V feeder cables between Manchester and Barton.—Callender's Cable & Construction Co., Ltd.

Portland.—Electricity Committee. Recommended:—
Transformers (£566).—Foster Engineering Co., Ltd.
Cable (£636).—Crompton Parkinson, Ltd.

Southend-on-Sea.—Town Council. Accepted:—
Apparatus required for the change-over of consumers' apparatus in the Britannia Road and Southchurch Road areas (£1,030).—W. Jay.

South Africa.—CAPE TOWN.—Electricity Committee. Recommended:—
One 4-panel and one 6-panel switchboard (£1,373).—A. Reyrolle & Co., Ltd.
Lighting and power installation at premises in Loop Street (£400).—J. Joffe.
10,000 ft. fibre duct (£444).—Griffin Engineering Co.
Pillar boxes (£601).—A. Vaux, Ltd.
250 electric light poles (£711).—Dowson, Dobson, & Behr, Ltd.

Swansea & Merthyr.—Joint Hospital Committee. Recommended:—
Wiring and fittings for electric light and power at new mental hospital.—H. J. Cash & Co., Ltd.

Forthcoming Events

Electrical Association for Women.—June 3rd-5th. Glasgow. Second International Conference.

Association of Mining Electrical Engineers.—June 9th-13th. Annual Convention. Friday, June 12th. Royal Hotel, Cardiff. 6 p.m. Annual dinner.

Faraday Society.—Wednesday, June 10th. Chemical Society. Burlington House, Piccadilly, W. 8 p.m. Annual meeting. Wednesday, June 17th. Royal Institution. "Michael Faraday." Dr. R. L. Mond.

Incorporated Municipal Electrical Association.—June 15th-20th. Scarborough. Annual Convention.

Royal Society of Arts.—Wednesday, June 24th. Adelphi, W.C. 4 p.m. Annual general meeting.

Electrical Contractors' Association.—June 24th-26th. Eastbourne. Annual Convention.

Tramways, Light Railways and Transport Association.—May 27th-29th. Margate. Annual Congress.

International Conference on Large Electric High-tension Systems.—June 18th-27th. Paris, France.

Notes

David Hughes

As one who was privileged to be David Edward Hughes's most intimate friend, Mr. Henry J. Spooner can claim to be well acquainted with his notable achievements. As some of them have apparently been overlooked, he pays tribute to Hughes's work in *The Times*, mentioning that on "June 2nd, 1899, the *Electrical Review* published a valuable article by Mr. J. Munro, describing, with illustrations, Hughes's remarkable experiments, and on February 2nd, 1900, the same journal, in its obituary article, stated that 'Hughes discovered the Hertzian waves before Hertz, the Branly "Coherer" before Branly, and the "wireless telegraph" before Lodge, Marconi, and others.'

"In 1880 Hughes consented to serve on a research committee of the Institution of Mechanical Engineers, and carried out some remarkable research work that led to his reading a paper on 'The Molecular Rigidity of Tempered Steel' in 1883. But this absorbing work of Hughes I cannot help thinking had not a little to do with the tapering off of his wireless researches."

Electric Eye for Airmen

A new mechanical eye which sees two miles through fog has been devised in the American General Electric Co.'s research laboratory. The apparatus is designed to be placed on the tail of an aeroplane, where it sights an airway light through the fog and reproduces on the aviator's dash a "synthetic" beacon in two parts: one shows the aviator whether the airway light is to left, right, or directly ahead and the other shows him whether he is approaching or going away.

Revised Overhead Line Regulations

The Electricity Commissioners have issued revised Overhead Line Regulations for securing the safety of the public, made by them under the Electricity (Supply) Acts, 1882 to 1928.

These regulations differ from those made by the Commissioners on April 16th, 1928, only in respect of regulations 5 and 18, which now read as follows (new matter is printed in italics).

Copies of the regulations can be obtained from H.M. Stationery Office, price 2d. net.

Line Conductors Crossing other Lines.

5. Where a line conductor crosses over or under, or is in proximity to any other overhead wire, precautions shall be taken by the undertakers to prevent contact, due to breakage or otherwise, between the line conductor and the other overhead wire, or between the other wire and the line conductor.

Provided that where a line conductor crosses over any overhead wire other than a telegraph or telephone line of the Postmaster-General, the precautionary means to be adopted shall be as hereinafter prescribed in paragraph (3) of Regulation 18.

Provided *further* that this regulation shall not be deemed to require the undertakers to take precautions against contact between a broken line conductor and other auxiliary conductors and earth wires carried on the same support and forming part of the same overhead line.

Road Crossings, &c.

18. Where an overhead line is erected along or across a public road or canal or across a railway *or crosses over any other overhead wire*, all wires *forming part of the overhead line* including earth wires and auxiliary conductors shall be placed at the approprite height from the ground specified in Regulation 16 for line conductors, and the following additional precautions shall be taken to prevent danger:—

(1) In the case of a line erected along a public road or canal (or within 50 ft. thereof) there shall be provided—

(*a*) duplicate insulators supporting the conductors; or

(*b*) a device to ensure that in the event of a line conductor falling it shall be put to earth; or

(*c*) other means approved by the Electricity Commissioners.

(2) In the case of a line erected across a public road, canal or railway there shall be provided—

(*a*) duplicate insulators for supporting the line conductor and a device to ensure that in the event of a line conductor falling it shall be put to earth; or

(*b*) duplicate insulators supporting duplicate conductors tied at intervals not exceeding five feet; or

(*c*) other means approved by the Electricity Commissioners.

(3) *In the case of a line crossing over any other overhead wire there shall be provided—*

(a) duplicate insulators for supporting the line conductor and a device to ensure that in the event of a line conductor falling it shall be put to earth; or

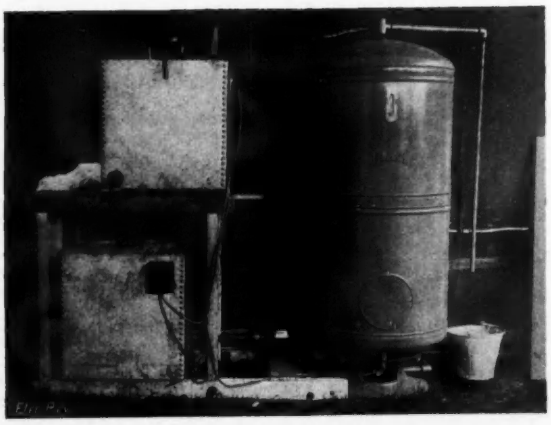
(b) duplicate insulators supporting duplicate conductors tied at intervals not exceeding five feet;

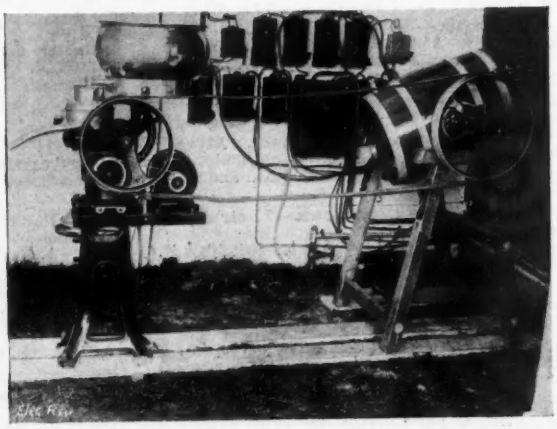
the provision prescribed in (a) or (b) hereof being supplemented in the case of line conductors at voltages exceeding 650 volts by the provision of arcing horns or rings; or

(c) other means approved by the Electricity Commissioners.

Rural Electricity

On p. 913 of this issue we deal with last week's Bath and West Show at Bristol, making particular reference to the exhibits—a model all-electric bungalow and dairy—arranged by the local Area Committee of the British Electrical Development Association. The illustrations accompanying this note depict some of the dairy equipment which was exhibited. The picture on the right shows a sterilising chest and a "Ferranti" electric boiler. The bottom left-hand figure illustrates an electrically-driven separator and a churn, while the third picture is of an electrically-operated milking machine produced by the Alfa-Laval Co.





Electrical Dairy Equipment Exhibited at the Bath and West Show, Bristol.

Electro-farming Conference

The 6th British Electro-Farming Conference, under the auspices of the British Electrical Development Association, Inc., will be held at the Royal Agricultural Show at Warwick in the members' large tent, at 3 p.m. on Thursday, July 9th. A paper on "Electricity on the Farm, including Dairy and Poultry Farming," will be read by Mr. M. M. Harvey.

Electricity in Welwyn Garden City

The first London luncheon of the Welwyn Garden City Chamber of Commerce was held at the Hotel Victoria, W.C.2, on May 20th. Sir Theodore G. Chambers, K.B.E., J.P., presided. The principal guest was the Rt. Hon. Arthur Greenwood, M.P. (Minister of Heath), who commended the gallant attempt made for the past ten years by Welwyn to redress the national balance now being upset by the lop-sided growth of the large towns. The Garden City, he said, was not a mere dormitory for London workers, but an independent town having a civic sense and a social life of its own. The Garden City was not the work of cranks, but was a sound business proposition inspired by the highest motives. The following statistics show the remarkable developments in the use of electricity for domestic purposes in the Garden City. There are 2,315 residential consumers (100 per cent.), with an average annual consumption in 1930 of 832 kWh; for the first quarter of this year the figure was 288, an increase of 28½ per cent. over the corresponding period last year. The number of cookers let out on hire by the undertaking is 1,009, so that not less than 43.6 per cent. of these consumers cook electrically, and three new cookers are sent out every two new consumers connected. The tariff is 1d. per kWh in the winter and 0.5d. in the summer. The quarterly charges are: for the newest enamelled types, 11s. 6d. (an economic rent) or, including kettle, 12s. 9d.; older black-finished types, including kettle, 9s. 6d. In spite of the difference in the rent, there is little demand for the older models. The price of gas is 13.6d. per therm, and gas cookers can be hired for 4s. per quarter. The Welwyn Garden City undertaking, of which Mr. A. T. Bullen is chief engineer and manager, receives a bulk supply from the North Metropolitan Electric Power Supply Co.

Wanted—A Name

In a letter from the editor of *British Plastics and Moulded Products Trader*, in our issue of May 15th, p. 853, reference was made to a competition which offered a prize of ten guineas for a name acceptable to the moulded products trade as a suitable one for describing plastic materials generally. We now learn that no definite result of the competition has been possible. The Council unanimously decided that not one of the names submitted could be accepted as achieving the object aimed at. It will be recalled that the letter referred to was prompted by the leaderette in our issue of May 8th, which suggested the desirability of establishing a name common to the whole range of synthetic-resin products used in the electrical industry and generally mis-termed "Bakelite."

Appointments Vacant

Technical assistant in the Directorate of Works, War Office.
Mains superintendent for Rawtenstall Electricity Department.
(See our advertisement pages to-day.)

Westinghouse Memorial Bridge

One of the worst bottle-necks between Pittsburgh and Philadelphia will be removed with the completion of the George Westinghouse bridge, a giant structure spanning a busy industrial valley, a distance of 1,510 ft. and 200 ft. above the railroad. The roadway of the bridge will be 42 ft. wide, sufficient for four lanes of traffic.

B.S.S. for Aluminium-alloy Sheets and Strip

A further specification relating to wrought aluminium alloys for general engineering purposes has recently been published by the British Engineering Standards Association. This relates to heat-treated sheets and strips and covers the material generally known as Y alloy. It is drawn up on parallel lines to the B.S.S. No. 395, which covers the alloy known as duralumin, with suitably modified test requirements. The chemical composition of the material, the tolerances permissible on the finished sheets and strip, and the tensile strength, proof stress, and elongation are specified. Appended to the specification is a useful memorandum dealing with the preparation and heat-treatment of the alloy. Copies of the new specification (414-1931) can be obtained from the British Engineering Standards Association, Publications Department, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

U-V Poultry Treatment

A 70 per cent. increase in egg production by a flock of 180 chickens treated two hours daily with ultra-violet rays is reported from America to have followed a test sponsored by the Missouri Public Service Co., Warrensburg, Mo., and the General Electric Supply Corporation of Kansas City, Mo. On the Case and Elling Farm, at Concordia, Mo., a flock of pullets was divided into groups of 180 each in a two-section house, insulated but unheated. Each group received the same food and ventilation. Egg production was checked from November 1st to January 1st and was found to be the same for each flock. Beginning on January 1st, group "A" was treated with ultra-violet radiation by means of two "General Electric sunlamps" suspended four feet above the feeder. They were automatically turned on at 5.30 a.m. and off at 7.30 a.m. Sufficient illumination was provided for group "B" for each flock to be off the roosts at the same time. After a month the untreated group had gained 13 per cent. over normal production and the treated flock gained 92 per cent. The increase for the former group and 13 per cent. for the treated group was ascribed to extremely mild weather conditions. With full allowance for the unseasonable conditions, the treated group showed a 70 per cent. increase as a result of the ultra-violet treatment. Group "A" showed an egg production of 2,150, while the untreated class gave 1,263 eggs for the month.

The Electric Traction Jubilee

We are reminded by the *Railway Gazette* that the credit of introducing electric propulsion is due to Dr. Werner von Siemens, who developed his system in the 70's of last century. Prior to that time various efforts had been made to propel rail carriages by means of both primary and secondary batteries, but technical difficulties and high cost combined to prevent any practical results ensuing. Dr. Siemens had laid down an experimental line at the Berlin Trades Exhibition in 1879, and its success justified the building of the pioneer electric railway, which was constructed at Lichterfelde, near Berlin, and opened on May 12th, 1881—50 years ago. The line extended from Anhalt station to the Cadet School, a distance of a little over 1½ miles.

A New Electric Tractor for Refuse Collection

A vehicle recently produced by Electricars, Ltd., for the haulage of trailers for refuse collection and other purposes is compact, having a wheelbase of 6 ft. 2in. and a track of 5 ft. 9 in. at the front and 5 ft. 3 in. at the rear. Two rows of accumulator cells are carried under the bonnet, the top of which is hinged along the centre, so as to facilitate inspection and "topping up." Within the driver's cab there are two more banks of cells, one on each side, making a total of 40 cells with a capacity of 500 Ah. A charging socket is mounted on the front of the chassis. Below the bonnet is slung a totally-enclosed series-wound motor coupled to the rear axle by means of a short propeller shaft. Designed to haul seven tons, the tractor has a speed of 10½ m.p.h. on the level, the batteries giving it a range of 35 miles on one charge. The equipment inside the driver's cab includes a drum-type series-parallel controller and a main switch having a removable key.

Electricity Supply Board, I.F.S.

President Cosgrave, in Dail Eireann on May 20th made a statement on the nature of the differences on matters of policy which caused the resignation of Dr. T. A. McLaughlin from the Electricity Supply Board. These differences, he said, involved the observance of the financial limitations imposed on the Board by the Oireachtas under Electricity Supply Acts, and of an undertaking by the Board as to the manner in which these limitations would be applied. In 1929 certain discussions took place between the Government and the Electricity Supply Board as to the items to be included in the capital sum of £2,500,000 provided for the Board under the Electricity Supply Act of 1927, and an agreement was reached as to the interpretation to be placed upon Section 12 (3) of that Act. The Government became aware that adequate steps were not taken in time to secure the proper observance of this agreement. The Dublin correspondent of the *Sunday Times* understands that difficulties have arisen with regard to the sum for development. The Board has failed to observe the money limitations imposed by law, and has "outrun the constable" to a considerable amount.

The accounts of the Board for the year 1929-30, now overdue, are shortly to appear. Unlike the main government accounts, they are kept on commercial lines, and will show the extent of its liabilities. It is not, however, the amount that matters, it is the principle involved. Whether the trouble takes the exact form suggested, it at least confirms a danger which from the outset some have felt about the scheme as a whole. It was big, costly and ambitious, it was proclaimed as a great national achievement, and has involved personal reputations and prestige. It has, therefore, lacked the cold calculating reality of a commercial concern, and has been more imaginative than conservative in its policy. On the other hand, it might be said in defence of the Board that large scale electricity development needs heavy capital outlay in the early stages, and that the limitations imposed by statute were unwise. The moral would appear to be that the less politics in business and the more business in politics the better. In the meantime the proposed statement of the Minister and the accounts of the Board for its first year of heavy pressure are awaited with interest.

Under the Electricity Supply Act of 1927, the finance falls under two heads. A sum of £5.8 millions was voted, and has since been spent on the construction, maintenance and repair of the Shannon works and high voltage networks. A further sum of £2½ millions was appropriated for development of the low voltage network, the purchase of existing undertakings, the establishment of showrooms and advances for wiring premises. Of this sum not more than £400,000 was to be advanced in any half-year other than the half-year prior to the appointed day—a day unspecified but not earlier than 1933—after which interest must cease to be paid out of capital, the repayment of advances must begin, and the scheme generally must be self-supporting.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

With this week's ELECTRICAL REVIEW **Mr. Albert H. Bridge** completes his fortieth year with this journal, having entered its service in the first week in June, 1891, as a junior on the editorial staff. Since then he has been a student of all movements and developments affecting the electrical industry. For many years Mr. Bridge has been Commercial Editor, and since 1921 a Director of the Company.

Mr. W. T. Young, general manager of the Halifax Corporation tramways, and **Major R. M'Creary,** Belfast, were interviewed by the Belfast Tramways Committee last week for the position of general manager of the city tramways in succession to Mr. W. Chamberlain, who was recently appointed a Traffic Commissioner. The Committee decided that before making a recommendation to the City Council it would ask the General Purposes Committee to reconsider the question of the maximum salary. This had been fixed at £1,500 per annum, but £2,000 is suggested as a more reasonable figure.

The Congleton Electricity Committee recently recommended that the salary of the Council's electrical engineer, **Mr. A. Pluck,** should be increased from £300 to £350. The Council referred the matter back to the Committee which has now remitted it to a sub-committee for consideration.

The *Huddersfield Examiner* reported last week that **Mr. E. A. Wills,** who was recently appointed engineer and manager of the Halifax Corporation Electricity Department had taken up his new duties. **Mr. F. N. Rendell-Baker,** whose place Mr. Wills has taken, was shortly leaving for Croydon.

Mr. W. H. Purnell, vice-chairman of Messrs. Herbert Morris, Ltd., Loughborough, has been appointed chairman of the company, in succession to the late Mr. Herbert Morris. Mr. Purnell joined the company in 1899 and has been on the board since 1908.

Mr. W. H. Hutchinson has been elected president of the Amalgamated Engineering Union.

In connection with its South American activities, Imperial and International Communications, Ltd., has set up an advisory local council of the Western Telegraph and associated companies in Buenos Aires for the general supervision of the companies' business in Argentina. The council is composed as follows: Don Guillermo Leguizamon, Sir Hilary Leng, Mr. L. P. O'Farrell, and Mr. A. J. Schwelm (chairman). Mr. J. Y. Cowie, the Western Telegraph Company's manager for Argentina and Uruguay, will act as secretary of the council.

Mr. E. G. Acons, Loughborough, has been appointed assistant superintendent to the Newcastle-upon-Tyne Electric Supply Co., Ltd.

It was announced at the annual meeting of the Electrical Finance & Securities Co., Ltd., last week that **Mr. H. C. Drayton** a director of the Electrical & Industrial Investment Trust, Ltd., had been invited to join the board of the company.

Mr. A. Logan, assistant sales engineer to the Bradford Corporation Electricity Department, has been appointed sales superintendent by the Aylesbury Town Council at a salary of £299 per annum.

Mr. C. Honour, Carlisle, has been appointed mains superintendent by the Taunton Town Council.

Mr. H. W. Roberts, secretary of the British General Electric Co., Ltd., South Africa, has arrived in England on a six months' visit.

Mr. John D. Troup, M.I.Mech.E., has sold his interest in the Engineering Review Publishing Co., Ltd., and relinquished his position as managing editor of *Engineering and Boiler House Review*. His new address is 34-35, High Holborn, W.C.1.

The *Irish Electrician* reports that the following have been elected officers of the Irish Radio Development Association: Chairman, Mr. James Kitchen (*Irish Radio News*); vice-chairman, Mr. F. T. Clark (Marconi (Ireland), Ltd.); hon. treasurer, Mr. L. Diffley (Baxendales, Ltd.); hon. secretary, Mr. H. C. Jacob (Siemens-Schuckert). Executive committee: Messrs. B. Comerford (Dundalk); H. J. Shirley (Irish Radio Stockists); C. R. Walker (Pim Bros., Ltd.); W. D. Hogan and G. Kehoe (Carlow); W. F. Grundy (Cossor, Ltd.); J. Atkinson (Mullard Wireless Service Co., Ltd.); H. J. Farrell (Ferranti, Ltd.); F. Swinburne (Baxendales, Ltd.) and F. Jones (Marconiphone). The objects of the Association are the promotion of the radio trade in Ireland in all its aspects, and to co-operate with kindred associations; to assist the authorities in developing the broadcasting service; and to do all things which may be calculated to further the better use of radio in Ireland.

Mr. H. G. Faulkner, an Englishman by birth, has been appointed managing director of the Swedish Electrolux Company.

Sir John Reith, Director-General of the British Broadcasting Corporation, is in the United States studying that country's broadcasting system. Last week he addressed the National Advisory Council on Radio in Education upon a number of matters in connection with broadcasting. In the course of his remarks, Sir John referred to the differences existing between the services existing in the United States and Great Britain and said that one of the chief motives of central control in this country was to secure coverage for the whole country in a qualitative as well as a quantitative sense.

Professor Einstein visited Oxford on May 23rd to deliver the third and last Rhodes Memorial lecture on his theory of relativity. The Professor had conferred upon him the honorary degree of Doctor of Science.

Obituary

Mr. R. R. Young.—The death is reported from New York of Mr. Richard R. Young, vice-president in charge of sales of the Public Service Electric & Gas Co., Newark, N.J. Mr. Young was born at Forest Hill, London, in 1866, and went to the United States at the age of 20. He served in the gas industry until the formation of the Public Service Electric Co. when he became a divisional agent of the company. He became sales manager to the company and the Public Service Gas Co., and in 1926 was appointed to the position which he held at the time of his death.

Mr. W. L. Winning.—We regret to learn of the death, at the age of 53, of Mr. Wilfred L. Winning, M.I.E.E., who was in charge of the Scottish interests of the Electric Construction Co., Ltd. Mr. Winning, after serving an apprenticeship with Messrs. Fisher, Ltd., Paisley, and Mavor and Coulson, Ltd., entered the Paisley Corporation Electricity Department as assistant mains engineer. Shortly afterwards he joined the Glasgow Corporation Tramway Department in a similar capacity, being there during the period in which the system was converted from horse traction to electrical operation. For two years he acted as charge engineer at the Pinkston station and then went to the British Westinghouse Co. as erecting engineer. Later he became sales engineer for the Glasgow area, a position which he held for 12 years. He joined the Electric Construction Co., Ltd., in 1918. Mr. Winning was active in the affairs of the Scottish Centre of the Institution of Electrical Engineers and was chairman of the Centre in 1926-27. He was one of the donors of the Scottish Benevolent Golf Cup, and owing to his death the annual competition which was to have been held on June 11th has been cancelled.

Lafayette [*Glasgow.*

The late Mr. W. L. Winning

At his funeral at Hillfoot Cemetery, Glasgow, there was a large representation of mourners from the various organisations with which he was connected. Mr. E. Seddon, Mr. G. Morgan, and Mr. J. Taylor attended on behalf of the Scottish Centre of the I.E.E.

Mr. S. C. Lees.—We regret to announce the death, at a London nursing home, of Mr. Samuel Charles Lees, manager of the Outdoor Constructional Department of Messrs. Ferguson, Pailin, Ltd. Mr. Lees was for many years in the employ of Messrs. Ferranti, Ltd., and left to join Ferguson, Pailin soon after the company's commencement. Mr. Lees occupied a central position among the workpeople and staff; for eleven years he was works manager, and in all devoted over seventeen years to the company.

The late Mr. S. C. Lees

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Volvox, Ltd.—Private company. Registered May 21st. Capital, £100 in £1 shares (50 6 per cent. cumulative preference and 50 ordinary). Objects: To enter into an agreement with S. I. Hitchcock, of 80, Auckland Road, Upper Norwood, to acquire from him the sole right to use the trade mark "Volvox," and to produce and sell the magnetic sound box of which he is the inventor, and to carry on the business of manufacturers of and dealers in sound receiving and transmitting apparatus, musical instruments, &c. The directors are: T. E. B. Davis, 6 Waterloo Road, Leyton, E.10 (insurance agent), and G. E. J. Blackburn, 87, Gore Road, Hackney, E.9 (clerk).

Glynceiriog Electricity Supply Co., Ltd.—Private company. Registered May 21st. Capital, £1,500 in £1 shares. Objects: To acquire the business of suppliers of electricity now carried on by the executors of the will of the late T. Foulkes at Llansantffraid, Glynceiriog, Denbighshire, as the "Glynceiriog Electricity Supply." The permanent directors are: S. Foulkes, Bon Marche, Llansantffraid, Glynceiriog, Denbighshire; Mrs. S. J. Foulkes, address not stated; A. D. Foulkes, 16, Alfred Street, Shrewsbury; and Mrs. A. O. Williams, address not stated. Solicitors: Minshall, Pugh & Co., Oswestry.

McAuleys, Ltd.—Private company. Registered in Belfast on May 15th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electrical engineers, &c. The directors are: J. McAuley, Junr., The Green, Dunmurry (company director); G. McAuley, 48, Stranmillis Gardens, Belfast (electrical engineer); and H. McAuley, Lancefield Road, Belfast (company director). Solicitors: John W. T. Watters & Son, Yorkshire House, Belfast.

Spherical Locomotion, Ltd.—Private company. Registered May 22nd. Capital, £10,000 in £1 shares. Objects: To acquire from South-West Electricity, Ltd., the benefit of certain inventions of Dr. J. A. Purves relating to locomotion; and to carry on the business of manufacturers and repairers of and dealers in vehicles of all kinds, &c. The directors are: W. C. Hands, 20, Northwick Avenue, Harrow; Margaret M. Partridge, 16, East Southernhay, Exeter; J. A. Purves, Chilliswood, Trull, Somerset; and C. N. Tweed, Hursely, Honiton, Devon. Solicitors: W. A. E. Stamp, Honiton, Devon.

Tariff Trading Trust, Ltd.—Private company. Registered May 19th. Capital, £10,000 in £1 shares. Objects: To carry on the business of a finance and investment company in all its branches, and that of hire-purchase traders, merchants, manufacturers and agents. Power is taken to manufacture or deal in plant and machinery for the electrical, mechanical and chemical industries, including domestic and labour-saving appliances, factory equipment, wireless apparatus, heating and refrigerating systems, &c. The directors are: A. W. Greenhill, 25, Queens Gate, Kensington, W. (director of Sout Fire Appliances, Ltd.); A. Barnett, 60, Brondesbury Villas, Kilburn, N.W. (secretary); and G. Fox, Easterland, Sampford Arundel, Wellington, Somerset (director of Candy & Co., Ltd.). Registered office: Trafalgar House, Waterloo Place, S.W.

Arion, Ltd.—Private company. Registered in Edinburgh on May 16th. Capital, £100 in 1s. shares. Objects: To carry on the business of manufacturers of acoustic amplifiers, opticians, electrical engineers, &c. The directors are: J. C. Pollock, 24, Mansion House Road, Langside, Glasgow (electrical engineer), and Miss Dorothy J. Pollok, 24, Mansion House Road, Langside, Glasgow. Solicitors: Stewart, Sons, Bremner & Nicol, 116, West Regent Street, Glasgow.

A. Avtsine, Ltd.—Private company. Registered May 22nd. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, mechanical engineers, &c. The first directors are: A. Avtsine, 98, Kings Road, Sedgley Park, Prestwich, Manchester, and N. Wither, 12, May Street, Monton, Manchester (both permanent). Registered office: Barlows Croft, Salford, Lancs.

W. T. Barnard & Co. (Lamps), Ltd.—Private company. Registered May 20th. Capital, £1,100 in £1 shares. Objects: To carry on the business of lamp manufacturers of all descriptions, general engineers, &c. The directors are: W. T. Barnard, 83, River Avenue, Palmers Green, N.13; F. J. Cunnington, 32, Raglan Street, Kentish Town, N.W.5; A. W. Foxcroft, 25, Kirkstall Avenue, Tottenham, N.17; and D. J. Oakes, 143, Carlingford Road, West Green, N.15 (all engineers). Registered office: 39, Red Lion Street, Clerkenwell, E.C.1.

Returns of Electrical Companies

Bretwood, Ltd. (formerly Radio Improvements, Ltd.).—E. J. Bell, of 23, King Street, E.C.2, ceased to act as receiver on May 8th.

Altres Hullock & Co., Ltd.—Debenture dated November 1st, 1930, to secure £750, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: E. J. Surman, 16, Walden Place, Welwyn Garden City. (Registered May 4th, 1931, by permission of the Court).

S. Rogers & Co., Ltd.—Capital, £660 in £1 shares. Return dated December 26th, 1930. 660 shares taken up. £660 paid. Mortgages and charges, nil.

Richard Elleray, Ltd.—Capital, £500 in £1 shares. Return dated January 6th, 1931. 203 shares taken up. £203 paid. Mortgages and charges, nil.

C. H. Sowerby, Ltd.—Capital, £100 in £1 shares. Return dated January 26th, 1931. 27 shares taken up. £27 paid. Mortgages and charges, nil.

J. H. Holmes & Co., Ltd.—Capital, £100,000 in £1 shares. Return dated December 16th, 1930 (filed May 7th, 1931). 50,000 shares taken up. £50,000 paid. Mortgages and charges, nil.

T. A. Keating, Ltd.—Capital, £2,500 in £1 shares. Return dated November 4th, 1930 (filed April 11th, 1931). All shares taken up. £1,250 paid, £1,250 considered as paid. Mortgages and charges, nil.

City Notes

Siemens Bros. & Co., Ltd.

The accounts of this company were abstracted in our last issue, p. 887, and the annual meeting was held on May 21st. Lord Queenborough, chairman, presided. Before proceeding with the business of the meeting, the chairman referred with regret to the death of Sir William Bull, who was a director of the company. Reviewing the company's business during the past year, he said that the increase in the trade investments shown in the accounts was chiefly attributable to an interest which they had taken jointly with some other companies in the purchase of a telephone undertaking in South America, the orders from which would bring additional work to their Woolwich telephone shops. The demand for submarine telegraph cable during the year under review was very small, but if the proposal to establish a cable telephone service between this country and the United States took definite shape, it would stimulate activity in submarine cable enterprise. They had manufactured and laid by their cable steamer *Faraday* a further cable between England and Belgium, and a similar cable between the mainland and the Isle of Wight. Another cable, of the coil loaded type, was supplied to the Japanese Government. The demand by the Post Office for underground telephone cable did not reach a high level, and was not sufficient to keep the plant well occupied. Contracts for underground telephone cable were executed for export to the Dominions. The orders for underground cables for power and lighting kept their manufacturing equipment well occupied. They were successful in securing an important contract from the Central Electricity Board, which included a number of cables of the supertension type. This contract was being carried out in the Midland counties. Substantial orders for power mains had also been carried out for leading industrial cities. Accessories, such as jointing and fuse-boxes, disconnecting and terminating apparatus of all kinds, had met with a steady demand. During 1930 their telephone workshops were engaged in the manufacture of a large number of public telephone exchanges, and the orders included a 10,000-line automatic exchange, equipped initially for 5,000 lines, at Perivale, and an extension of Maida Vale, both in the London area, as well as exchanges and extensions of existing exchanges in provincial areas. Among the overseas contracts for telephone exchange equipment and extensions of existing exchanges were: Hongkong (toll switchboard); Pietermaritzburg, Cape Road, Walmer (South Africa); Buluwayo (South Rhodesia); Winnipeg Main, Elmwood, Saskatoon (Canada); Suva (Fiji); Santiago, Vina del Mar (Chile); and Pernambuco (Brazil). They had brought into service three large automatic public exchanges in the London network, 11 in provincial areas, and six overseas. Substantial quantities of telephone apparatus had been supplied to H.M. Post Office, to Australia, Brazil, Canada, Chile, China, Denmark, Dutch East Indies, New Zealand, Portugal and South Africa. The popularity of the "Neophone," the new hand combination telephone manufactured by them for the Post Office for public service, continued to increase, and upwards of 100,000 had already been delivered for home and overseas use. In May, 1930, they acquired by purchase the rental and maintenance business of the Relay Automatic Telephone Co., Ltd., and they had set up the necessary organisation throughout the kingdom to handle efficiently the hire-purchase and rental of private telephone systems. In this connection they had also designed and placed on the market a number of new patterns of automatic telephone exchange equipment. A good demand had been experienced for primary batteries for heavy work, but the sales of radio batteries were not up to expectations. The new "Full o' Power" batteries now being manufactured and widely distributed should enjoy increased sales. These new types had been tested out in the Dominions with gratifying results. Despite the large number of vessels laid up and the reduced activities of the shipbuilding yards, the turnover in marine apparatus, such as electric telegraphs, loud-speaking telephones, &c., had increased, and the number of vessels on board of which they operated or maintained wireless-telegraph apparatus, was in excess of that of any preceding year. A considerable amount of work was in hand in connection with the North-West England Scheme, and work had now commenced on the East England Scheme for 132,000-V lines. Large contracts had also been secured in Egypt and India. Contrary to expectation, the value of orders received during the year, so far from receding, showed a slight advance, but the work had to be taken at unremunerative prices, and this business could only be justified in order to maintain high productive efficiency by the plant being kept employed as fully

as possible. In connection with their endeavour to obtain more business in South America, they had a display at the British Empire Trade Exhibition at Buenos Aires, and issued special publications in the Spanish language for distribution to visitors. Having regard, however, to some of their main overseas customers, namely, India, Australia, and New Zealand, the prospects were not favourable. Their subsidiary, Siemens Electric Lamps & Supplies, Ltd., had again shown satisfactory results, and their relations with Siemens & Halske A.G. continued eminently satisfactory. The report and accounts were adopted.

Electrical Finance & Securities Co., Ltd.

Presiding at the annual meeting on May 21st, Mr. G. H. Nisbett (chairman) said that during the year under review their investments had grown from £459,833 to £612,521, while the amount owing to them by subsidiary companies had fallen from £73,420 to £39,551; the net increase in assets was therefore £118,800, which, with small differences in other items, balanced the increase in the company's indebtedness. The time was drawing near when it would be advisable to issue further capital, and this was being considered by the board. The business of the subsidiary companies continued to expand satisfactorily, an aggregate of 2,661 new consumers having been connected during the year. The progress made by the Lothians Company was comparatively slow, because in common with similar undertakings depending substantially on power supply, the effect of the present trade depression was clearly noticeable. However, substantial progress had been maintained by means of an intensive campaign among domestic consumers. Since the closing of the accounts and up to date, new business in all the subsidiary companies had developed at a satisfactory rate. It was intended to invite Mr. H. C. Drayton, a director of the Electrical & Industrial Investment Co., Ltd., and other companies, to join the board. The report and accounts were adopted.

Lancashire Electric Power Co., Ltd.

The annual meeting of the company was held on May 21st at Winchester House, Mr. Alfred Shepherd, W.S. (chairman) presiding. In presenting the report and accounts (ELEC. REV. May 22nd, p. 887), the chairman announced the resignation of Mr. H. C. Levis and Dr. Parshall from the board and the appointment of Mr. W. C. Lusk and Mr. C. D. Taite as directors to fill the vacancies. Turning to the accounts Mr. Shepherd said that for the first time in its history the power company had experienced a reduction in output and profits on trading, the energy sold showing a falling-off of 2.6 per cent. and the profits a decrease of £11,381. The interests of the company were dependent, to a large extent, upon the Lancashire cotton industry, and the reduction was mainly due to loss in output of textile mills in the district. With the exception of domestic consumers, all classes of load had shared in the general industrial depression and, in spite of the reduction in the receipts, the company had still to bear the burden of heavy rates and taxes. The company had always pursued a forward policy with regard to the development of supplies under the Order which it held for general distribution. By the introduction of a comprehensive scheme for the sale of apparatus and for wiring, every effort was being made to increase the consumption of present consumers and to obtain additional ones. As a result, in spite of the depressed condition of trade, there was an increase in the number of domestic consumers. Kearsley station had proved itself to be highly efficient, and had already taken its place as a very valuable asset to the company. The Electricity Commission's return for the year ended March 31st, 1929, indicated that the company's Padiham station was the most efficient in the country for that year; for the year ended March 31st, 1930, this position was taken by the Kearsley station for the five months during which it had then been operating. The Kearsley station, owing to the higher steam pressures and temperatures adopted and the much larger size of the generating units, showed a considerable advance in economical operation as compared with Padiham. A striking indication of the improvement in efficiency was shown by a comparison of the figures for 1928 and 1930 respectively. In the latter year there was an increase in output over 1928 of 15 per cent. without any appreciable increase in coal consumption. The company had continued to increase its sphere of operations by developing new areas of supply, and, during the year, in addition to providing 15 miles of 11,000-volt feeders and 5½ miles of 2/3,000-volt mains, it had installed no less than 39 miles of l.p. underground and 12 miles of overhead distribution mains. While none of the company's stations had yet come under the direction of the Central Electricity Board, negotiations had been proceeding in respect of extensions of switchgear which the Board would require and in regard to sub-station sites. It was not anticipated that any connection between the company's system and that of the Board would take place during the present year. The report and accounts were unanimously adopted.

Shanghai Electric Construction Co., Ltd.

The annual meeting was held on May 21st, Mr. J. S. Haskell (chairman) presiding. In presenting the report and accounts (ELEC. REV., May 15th, p. 847)) the chairman said that the year had by no means been free from difficulty. In the month of April, 1930, they had a strike, which meant a total loss of revenue for a short period, but more serious than that temporary disturbance was the severe and continued fall in the value of silver, and there was at present no indication of any material improvement under that head. The instability of the silver currency was immediately reflected in the sterling value of their profits. Depreciation of subsidiary coinage was another of the vicissitudes to which their undertaking had always been subject. The sustained fall in the value of currency in which they collected fares had rendered successive revisions of fares unavoidable. The revision in 1930 had taken place a few days before the strike occurred, and the necessary restoration of the company's earning power had been deferred for a time. As a result of the unfavourable course of exchange, they had had to make special allowances to their foreign and native staffs, and the cost of supplies essential to operation had materially increased. Those conditions had been progressive and the present effect of them was far greater than it had been for last year as a whole. It had, therefore, been necessary to revise the scale of fares once more, and a new tariff had been put into operation on April 19th of the current year. The revised fares were well within the limits authorised by the Municipal Council. As a result of representations made to the Municipal Council regarding the contributions paid by the company in respect of trolley-'bus operation, the Council had agreed to reduce the royalty of 5 per cent. of gross receipts to 1¼ per cent. The Singapore Traction Co. had been able to show substantially increased earnings, and the share of the profits which became payable to the Shanghai Co., as managers, had been increased to £16,000, which was £2,000 higher than in the preceding year, and brought their total participation in profits to date up to £50,000. The report and accounts were adopted.

Urban Electric Supply Co., Ltd.

The accounts of this company were abstracted in our last issue, p. 887, and the annual meeting was held at Winchester House on May 21st. Mr. H. B. Grotrian, K.C., who presided, said that the year 1930 had shown progress so far as the connection of new business was concerned, the load added amounting to 4,789 kW, which was higher by 8 per cent. than the previous total, but notwithstanding the increased connections to the mains the total output showed a net decrease of just over 3,000,000 kWh. This decrease was more than accounted for by the reduced output of the Cornwall Electric Power Co., which to a large extent relied upon the tin mines to provide the bulk of its income. The depression in the tin industry had had a serious effect on the sales of that company, which recorded a drop of nearly 4,000,000 kWh, the bulk of which decrease was felt in the last quarter of the year. Under such conditions it was inevitable that the profits of the Cornwall company should decrease, and the income derived from that source had fallen from £9,250 to £7,500, a decrease of £1,750. As an outcome of negotiations which followed the receipt of notices from the Twickenham, Teddington and Hampton Councils of their intention to exercise their rights of purchase it had been agreed between the parties that the company should sell rather more of the undertaking than was covered by the notice to purchase, and that the purchaser should also buy the generating station. It had further been agreed that the purchaser should be the London and Home Counties Joint Electricity Authority. Negotiations were now proceeding with regard to the remainder of the company's interests in these areas and it was quite possible that they would have been sold before the next annual meeting. The report and accounts were adopted.

Richard Johnson & Nephew, Ltd.

Presiding at the annual meeting on May 21st, Lt.-Gen. Sir Walter Campbell, in reviewing the balance sheet, said that their surplus liquid assets stood at over £415,000. There was considerable correspondence to-day on the subject of salesmanship, but so far as their salesmen were concerned, he had nothing but praise. They had a very uphill task to sell their goods against foreign competition; foreign wire was manufactured under the advantage of, comparatively speaking, moderate taxation, lower wages, longer hours, and export bounties. Sooner or later it was hoped to obtain some measure of protection for home industries in the home market; but in the meantime they had to make the best fight they could against 60,000 tons of imported wire, dumped at a price far below what these foreign firms charged for the same article in their own country. Last year he mentioned that they had received a share of the work placed under the Central Electricity Board scheme, and they had continued during the year under review to receive further orders, both for home and export, for the supply of steel-cored aluminium conductors. Practically all the main grid contracts had now been placed, but they looked forward to receiving their share of subsidiary lines as and when they came into being. Turning to the export trade, he said that the price of all primary products was now at the lowest figure the world had ever seen, the consequence being that the purchasing power of all the countries with which they did business was sadly curtailed; this inevitably reflected itself in their export tonnage. The report and accounts were adopted.

Imperial Continental Gas Association

At last week's annual meeting of this company, which has large electrical interests, reference was made to the Interbrabant Company which supplies electricity in bulk in Belgium, and it was stated that steps were being taken to co-ordinate the activities of the company's Belgian gas and electricity undertakings. Since the close of the financial year an investment of £540,000 had been made in the new company which had been formed to take over the Berlin electricity supply from the city authorities.

Chloride Electrical Storage Co., Ltd.

The annual meeting was held on May 22nd, Mr. W. S. Naylor (chairman) presiding. In presenting the report and accounts (ELEC. REV., May 22nd, p. 888), the chairman referred with regret to the death of Mr. J. de Berniere Smith, a director. Reviewing the progress made during the year, he said the company's interests had continued to expand, and it was no doubt to some extent due to this broader basis of their business that they had been able to meet, with a considerable measure of success, the keen competition at home and abroad. The increase under investments in the value of shares held in subsidiary companies, shown on the balance sheet, was due in part to the further expansion of the company's interests, and in part to the fact that in some instances where their business was formerly carried on as branches, subsidiary companies had been formed. An important addition had been made during the year to the works by a new block which housed new laboratories and offices for the technical staff engaged on electro-chemical research and experimental work. It also provided better accommodation for the medical and dental clinics. They had housed in a specially arranged room a most complete collection of specimens, illustrating the development in storage battery manufacture during the last 40 years. Up to date some 700 exhibits had been classified and a descriptive card allocated to each specimen. Turning to the sales side of their business, they had put on the market the "Drydex" dry battery, which had been widely advertised. The response from both the trade and the public had been most gratifying. The annual Convention of Exide service agents was to be held next month at Bournemouth, when an attendance of some 500 was expected at the business meetings. This convention fostered and developed the good fellowship which existed between their service agents and the company. The service organisation penetrated into such places as Iceland, New Guinea, Siam and Nigeria, and was world-wide. Among many interesting orders received from within and outside the Empire was a contract from the Government of Latvia for batteries for submarines. The order was secured against the keenest competition from Continental battery makers, and their success was a tribute to the value placed abroad on British quality, and showed what could be done by British salesmanship. They had received valuable assistance from the Department of Overseas Trade and their representatives in Riga. The "Keepalite" emergency lighting system had been developed and extended, and they had received orders from both large and small hospitals all over the country. The system was also successfully employed on ships, not only for emergency lighting, but for operating in the event of a generating breakdown, the steering gear, gyroscopic compass, electric clocks, and the wireless apparatus. The new superliner *Empress of Britain*, of the Canadian Pacific Railway Company, had been equipped with their apparatus, and the British India Steam Navigation Company's 10,000-ton twin-screw turbine steamers *Karanja* and *Kenya* were equipped with "Exide-Ironclad" batteries for emergency steering and engine room lighting. Similar installations for emergency lighting had also been carried out by them on the three latest cargo liners of the New Zealand Shipping Company. Another interesting development was the introduction on the London and North Eastern Railway of electric cooking on trains. Batteries of their "Exide-Ironclad" type were playing their part in this step in the direction of increased safety for railway passengers by the substitution of electricity for gas in the kitchen cars of express trains. "Chloride" and "Exide" batteries had been installed at the new B.B.C. station at Moorside Edge, which were capable of taking over the whole of the electrical requirements for a period of one hour. On looking back over the year's order book one was struck by the variety of interesting uses to which their batteries were being put and to the extent modern civilisation was dependent on the storage battery. They were constantly studying schemes to enlarge and develop the scope of uses to which batteries might be advantageously applied. The success depended not alone on the extent of their business in accepted uses of storage batteries, but upon the development of new uses. The efficiency of the works had been well maintained, and they were proud of their manufacturing organisation. The high standards which they had set themselves relating to the health, comfort, and recreation of their employés had been lived up to, and this consideration was appreciated. As evidence, they had some 50 employés who had completed 25 years' continuous service with the company. This long period of service with one firm deserved recognition, and they did this in the form of a framed illuminated certificate accompanied by a gift of £100. The report and accounts were adopted.

German Company

As was briefly mentioned in our issue of May 15th the municipal electricity undertaking of Berlin is being taken over by a new concern known as the Berliner Kraft and Licht Gesellschaft formed under the auspices of a consortium of leading German and foreign banks and financial syndicates. The capital of the new company has been fixed at £12,000,000, constituted as to £8,000,000 of "A" shares which carry one vote and £4,000,000 of "B" shares each with two votes, the latter being divided between the Berlin municipality and two financial concerns. The £8,000,000 shares are being taken by financial groups in eight different countries—Germany, Belgium, the United States, Switzerland, England, Holland, Sweden and Italy. Of the German quota £1,700,000 is being offered for subscription by the public at 110 per cent. The new company acquires the sole concession for the supply of electricity for lighting and power purposes in the Berlin area and is authorised to fix supply tariffs which will ensure for it a minimum annual dividend of 10 per cent. The municipal authorities of Berlin, however, retain a right to re-purchase the electricity undertaking at the end of 25 years.

British Electric Traction Co., Ltd.—The profits for the past year showed an increase—from £253,081 to £271,005. The distribution on the deferred ordinary stock is the same as for 1929-30, *viz.*, a cash dividend of 5 per cent. and a bonus of 10 per cent. in fully-paid £1 deferred ordinary shares. The 6 per cent. cumulative participating preference shares receive a further 2 per cent., making 8 per cent. for the year, and £80,217 is added to the undivided profits account, raising the total to £332,015.

The report of the *Sphere Investment Trust, Ltd.*, for the year ended March 31st last shows a balance, with £3,272 brought forward, of £51,310. A dividend at 4½ per cent. for the year is proposed on the ordinary shares, leaving £3,622 to be carried forward.

Meters, Ltd., reports a net profit of £17,340 for the year ended March 31st last (against £20,310 for 1929-30). The final ordinary dividend is 6½ per cent., maintaining the total for the year at 9 per cent. A balance of £3,702 is carried forward (against £5,899 brought in).

Ruths Steam Storage, Ltd.—At an extraordinary general meeting, held on May 22nd, resolutions for the reduction of the company's capital were sanctioned. Particulars of the reorganisation scheme were given in our last issue.

The report of the *Para Telephone Co.* for 1930 shows a profit of £7,566. A final dividend of 3 per cent. is paid, making 5½ per cent. for the year, £3,247 is appropriated for depreciation, &c., and £2,195 is carried forward.

The *Canadian General Electric Co.* has announced a quarterly dividend on the common stock of $1 per share for the quarter ending June 30th.

The *American Telephone and Telegraph Co.* has declared the regular quarterly dividend of $2.25 per share on the common stock.

The *Electric Bond and Share Co.* has declared its regular quarterly dividend of 1¾ per cent.

Stocks and Shares

TUESDAY EVENING.

STOCK Exchange markets have mended materially since this time a week ago. The financial atmosphere, which had vibrated with rumours of difficulties involving some of the principal houses in the world, calmed down to more normal conditions. The avalanche of selling that had been let loose in the earlier part of May, and whose volume threatened to sweep prices down to ridiculous levels, became passive, apparently exhausted by its own pace. The voice of the bargain hunter was heard in the land. Evidence of the change in sentiment is provided by the rallies amongst the group of shares in the electrical manufacturing and equipment companies. America has been less frenzied in her eagerness to sell, and the Continental exchanges are also less disturbed.

Electricity Supply Shares

The change in sentiment amongst Electricity Supply shares is marked more by withdrawal of selling orders than by any particular movement in prices. County of London ordinary and Metropolitan ordinary are, however, better at 45s. and 40s. 9d., respectively. In both of these a small speculative position prevails. The provincial shares are distinctly better. Bournemouth & Poole, Clyde Valley, and Scottish Power are amongst the most favoured. Whereas the pressure to sell had been very marked in shares of companies held largely across the Tweed, the cessation of liquidation provided purchasers who had been waiting for the psychological moment to step in. Clyde Valley, at 32s., are 3s. 3d. up. The only downward movement is in Electric Supply Corporation ordinary, where the price, at 42s. 6d., is 3s. 9d. lower on the week.

Westminsters and Londons

That shares have come to market during the May malaise can be seen by the fact that two thousand Westminster Electrics and three thousand London Electrics are on offer at 29s. 3d. and 34s., respectively. As everyone knows, the dividends on the ordinary shares of various London companies' shares will come down to 7 per cent. after the end of this year. Hope—and reasonable ground for it—looks for the companies to distribute new shares in such a manner as will give shareholders a dividend that will roughly approximate the present amount of distribution. That is to say, anticipation looks for the Westminster Company to provide a bonus of one new for every 6½ shares now held. This would come from the special reserve fund, at present £152,000 and likely to be nearly £200,000 by the end of 1931. Assuming the bonus issue to be made as just suggested, a 7 per cent. dividend would give a yield of about 5½ per cent. on to-day's price of the shares.

In the ELECTRICAL REVIEW tables of prices and yields, the latter are calculated on the basis of 7 per cent. at current

quotations as regards those companies which come under the strict operation of the Act. No allowance is made, of course, for the probably increased return that would be given by means of an issue of bonus shares.

Gilt-edged Strength

The 4½ per cent. debenture stocks of the Central Electricity Board and the London & Home Counties J.E.A. are both a point higher, at 98. London Power 5 per cent. new debenture has hardened to 5 premium. Of the preference issues, Llanelly firmed up to 15s. On the other hand, West Gloucester 6½ per cent. preference, at 74½, is lower.

Cables and Wireless

Advances in the Cable & Wireless issues represent the result of purchases on behalf of the bear party, supplemented by a slender amount of speculative support. Whereas £100 of each class of stock could have been bought, a week ago, for £70 cash, the cost would now be about £5 more. When the "merger" stocks came first to market, three years ago, the combined price of the trio was nearly £200. It is not astonishing that, bearing in mind Cables & Wireless, Imperial Chemical, and a few other recent large combines, people should look a little askance at proposed developments by other concerns, in the same direction.

Marconi Marines at 31s. 3d. are 2s. 6d. higher on the week, the shares having been unduly depressed, previously, by forced selling. Great Northerns followed up their previous drop of 25s. by going back a further £1. Globe Telegraphs are 1 down at 8½ and the preference 10s., at 9½. Eastern Telegraph 3½ per cent. preference stock is changing hands on the basis of 63, at which price the return is £5 19s. per cent. on the money. Dividends are payable quarterly. Direct Spanish Telegraph ordinary remain dull at 7 and the 10 per cent. preference shares at 6, both issues being of the nominal value of £5. Anglo-Portuguese Telephone ordinary shares were marked a week ago at 18s. American Telephone & Telegraph shares are 10 points down at 170. Internationals, at 26, show no net change.

Dollar Stocks

Mexican utilities are irregular, a gain of 1 in Mexican Light and Power Common being offset by a fall of 3 in the company's 7 per cent. preferred shares. Brazilian Tractions are a shade better at 15¼, after dropping to 14¾ and rallying to 16¼. Business was recently recorded at 85 in the company's 6 per cent. preference shares. Rio Tramway 5 per cent. first mortgage bonds at 97½ and the company's 5 per cent. second mortgage at 81½ have not wholly recovered from the flatness that lately overtook all Brazilian issues, Government, railway and utility. Nor are the Canadian and United States issues in danger, yet, of inflation. Shawinigan Water remains flat at 41½; Montreal Light and Power is 3½ down at 50½ and Power Corporation of Canada 1½ at 48.

Perak Hydro-Electrics are a heavy market. Business has been done as low as 30 in the 7 per cent. participating debenture, and the shares at 3s. remain depressed.

Manufacturing and Equipment Companies

It is said that, in the recent Stock Exchange slump, strong selling pressure was exerted against shares in the electrical and cable manufacturing companies. No adequate reason was forthcoming to account for this, and it was very noticeable how sharply the prices rebounded upwards, as soon as the liquidation came to an end. Enfields, Henley's, and British Insulated were rapidly advanced. In the case of Callender's the price was temporarily held back by knowledge of 1,500 shares being on offer. Brush is 60 ex the reduced dividend of 5 per cent., less tax. If this rate is maintained, Brush ordinary will pay 8½ per cent. on the money. Siemens have rallied to 20s. 9d. G.E.C. ordinary have strengthened to 38s.; the shares are now dealt in on the Paris Bourse. Associated Electrical Industries ordinary have picked up to 18s. 6d. Crompton Parkinson ordinary drooped to 18s. 9d.

Railways and Traction

Time was when so brilliant a Bank Holiday as Monday in this week would have stimulated the prices of electric railway stocks and shares. But other times, other considerations; and the London Passenger Transport Bill is now a greater factor in the situation than the other elements are. Districts have receded to 64½, and Metropolitan consolidated remains weak at 46½. But Underground Electric ordinary did put on the pence at 20s. 6d., and the prior-charge stocks in this group are better in sympathy with the rises amongst gilt-edged securities as a whole. London Electric Railway and Central London Railway 5 per cent. debenture stocks are up to 105, the best price they have hitherto reached.

British Electric Traction deferred ordinary at 1050 has regained 275 points of the drop which occurred during the past fortnight.

Miscellaneous Matters

Shares in the heavy industries are mostly better. Babcock and Wilcox, after their fall to 38s. 9d., have recovered to 43s. Vickers reached 6s , rose to 6s. 9d., and are now 6s. 6d. The rubber share market is as quiet as it is uninteresting, but efforts are being made to see whether something cannot be done to mend plantation misfortunes.

Share List of Electrical Companies

Home Electricity Companies

	Nom.	Approx. Dividend 1929.	1930.	Price May 26 1931.	Rise or fall.	Yield p.c.
	£					
Bournemouth and Poole	1	15	15	57/6	+1/6	5 4 2
Brompton Ordinary	1	8½	8½	28/-	—	5 0 0
Central Electricity 4½% Deb. ...	Stock	—	—	98	+1	4 12 0
Charing Cross Ordinary	1	8¼	8⅛	29/6	—	4 15 0
Chelsea	1	8⅝	8⅝	27/6	—	5 1 10
City of London	1	10	10	36/3	—	5 10 3
Clyde Valley	1	8	8	32/-	+3 3	5 0 0
County of London	1	7	10	45/-	+1/9	4 9 0
Edmundsons' 7% Pref.	1	7	7	25/6	—	5 9 10
Elec. Supply Corporation	1	11	11	42/6	−3/9	5 3 9
Kensington Ordinary	1	8	8	29/6	—	4 15 0
Lancs. Light and Power	1	7	6½	21/3	—	6 2 4
London & Home Counties 4½% Deb.	Stock	—	—	98	+1	4 12 0
London Electric	1	8½	9	34/-	—	5 5 11
Metropolitan	1	9	10	40/9	+1/9	4 18 3
Midland Counties	1	6½	7	26/3	—	5 6 8
Mid. Elec. Power	1	15	8	27/6	—	5 16 5
Newcastle-on-Tyne Ordinary ...	1	6	6	21/3	—	5 13 0
do. 7% Pref.	1	7	7	27/-	—	5 3 8
Notting Hill 6% Pref.	10	6	6	11¼	—	5 6 8
North Met. Elec. 6% Pref....	1	6	6	24/-	—	5 0 0
St. James' and Pall Mall	1	8	8	28/6	—	4 18 3
Scottish Power	1	8	8	27/6	+⅛	5 16 5
South London	1	8½	8½	27/6	—	5 1 10
Urban Ordinary	1	7	7	28/-	—	5 0 0
Westminster Ordinary	1	8½	8½	28/6	—	4 18 3
Whitehall Elec. Invst. 7½% Pref....	1	7½	7½	24/6	—	6 2 5
Yorkshire Elec.	1	8	8	30/-	—	5 6 8

Home Rails

Central London Ord. Assented ...	Stock	4	4	76	—	5 5 3
Metropolitan	,,	4	8½	46½	—	7 10 6
do. District	,,	5	5	64½	−1	7 15 0
Underground Electric	£1	8	8	20/6	+6d.	7 16 1

Telegraphs and Telephones

Anglo-Am. Tel. Pref....	Stock	6	6	103½	—	5 16 0
do. Def-	,,	1½	1½	25½	—	5 17 8
Automatic Telephone	1	12½	12½	32/6	—	7 13 10
Cables & Wireless 5½% Pref. ...	Stock	5½	5½	52½	+1	10 9 6
do. A 7½% Ord.	,,	Nil	—	13	+1½	... ...
do. B Ord.	,,	Nil	—	7½	+1½	... ...
Globe Tel. and T. Ord.	10	10	—	8½	−1	... ...
do. do. Pref.	10	6	6	9½	−⅜	6 6 4
Great Northern Tel....	10	20	20	27	−1	7 8 2
Marconi-Marine	1	15	15	31/3	+⅜	9 12 0
Oriental Telephone Ord.	1	12	12	2½xd	−⅛	*5 6 8

Home and Foreign Trams, &c.

Anglo-Arg. Trams First Pref. ...	5	5½	—	15/-	—	... ...
do. do. 2nd Pref. ...	5	6	—	7/6	—	... ...
do. do. 5% Deb. ...	Stock	5	5	27½xd	+9	18 3 8
British Electric Traction Def. Ord.	,,	5	5	1050	+275	... ...
do. do. Pref. Ord. ...	,,	8	—	122½	—	6 10 8
Brazil Traction	100	8	—	15¼	+¼	... ...
Brit. Columbia Elec. Rly. Pce. ...	Stock	5	5	97½	—	5 2 7
London & Sub. Trac. 5% Pref. ...	1	Nil	Nil	11/6	—	... ...
London United Tram Deb. ...	Stock	4	4	62½	—	6 8 0
Mexico Trams, 5% Bonds	—	5	5	45½	—	10 19 10
Mexican Light Common	100	Nil	Nil	38½	+1	... ...
do. 7% Pref.	100	7	7	66½	−3	10 10 6
do. 1st Bonds	—	5	5	79	—	6 6 7
Victoria Falls Ord.	1	15	15	58/-	—	5 3 5
Yorkshire (West Riding)		Nil	Nil	5/6	—	... ...

Manufacturing Companies

Assoc. Elec. Ord.	1	6	6	18/6	+9d.	6 9 9
do. Pref.	1	8	8	27/6	—	5 16 0
Babcock & Wilcox	1	15	14	43/-	+4/3	*6 7 10
British Aluminium Ord.	1	10	10	25/-	—	8 0 0
British Insulated Ord.	1	15	15	2⅛	+⅛	5 17 2
Brush Ord.	Stock	10	5	60xd	—	8 5 0
Callenders	1	15	15	2¼	—⅛	6 13 4
do. 6½% Pref....	1	6½	6½	25/-	—	5 4 0
Crompton Parkinson Ord.	5/-	90	90	1½	—	8 0 0
do. 8% Pref.	1	8	8	28/-	—	5 14 5
Edison-Swan 1st Pref.	1	7½	7½	23/9	—	6 6 4
do. 5% Deb.	Stock	5	5	94½	—	5 5 10
Electric Construction	1	5	5	12/6	—	8 0 0
Enfield Cable Ord.	1	25	25	3⅝	+⅛	6 14 1
English Electric	1	Nil	Nil	5/-	—	... ...
do. do. Pref.	1	Nil	Nil	5/-	—	... ...
Ferranti Pref.	1	7	7	21/6	—	6 10 4
G.E.C. Pref.	1	6¼	6¼	26/-	—	5 0 0
do. Ord.	1	14	14	38/-	+6d.	7 7 4
Henley	1	30	30	4⅝	+⅛	6 9 10
do. 4½% Pref.	5	4½	4½	4⅝	—	5 2 10
India-Rubber	1	Nil	Nil	5/-	—	... ...
Johnson & Phillips	1	10	10	27/6	—	7 5 6
Siemens Ord.	1	7½	7½	20/9	+9d.	7 4 7
Telegraph Construction	12	10	7½	13	—	6 18 3

*Dividends paid free of Income Tax.

American Electrical Trade and Industry

The effects of trade depression: Great Britain as customer and supplier

SOME idea of the troublous times through which the United States has been passing can be gained from the recent report to the Department of Overseas Trade by Sir J. J. Broderick, K.B.E., and Mr. A. J. Pack, respectively Commercial Counsellor and Commercial Secretary to the Washington Embassy (Stationery Office, 3s. net). The decline which set in during the latter half of 1929 continued at an accelerated pace during last year, and practically every branch of industry and trade was affected, more particularly those groups upon which the general prosperity of the country depends most largely. It is considered, however, that the worst has passed, and there are fairly general indications of eventual, if not rapid, improvement, although it must be remarked that the American dispatches of the past week are far from reassuring.

Credit and the Instalment System

In reviewing the causes of the depression, Sir J. J. Broderick suggests that the undue expansion of credit immediately prior to the slump was very largely to blame. Referring to the instalment-buying system, he says that it has been regarded by some of its apologists as the greatest prop of American prosperity in recent years, and by its critics as a dangerous device likely to complicate a bad situation in hard times. Statistical evidence gives some support to both points of view. In a number of the more newly developed industries, such as those producing motor vehicles, household electrical appliances, radio supplies and so forth, there are many indications showing the enlivening effects of the system during the prosperous years, and there can be no doubt that it gave great momentum to the activity of these and other industries. On the other hand, it is equally clear that a large amount of instalment indebtedness outstanding when depression set in acted as an additional check on sales of all classes of goods. Liquidation of such indebtedness during the past year or eighteen months, however, has proceeded on the whole in a very orderly manner without any alarming number of personal bankruptcies, while the reduction in the volume of new instalment sales has been no greater than the reduction in general business activity. This is probably due, in great part, to the manner in which instalment sales have been financed, namely, by the establishment of a large group of capably managed finance companies that purchase the credit paper from the manufacturers and dealers and use it as collateral for such credit from banks and other sources as they may need themselves for carrying on the business. It is estimated that at its highest point the instalment business did not exceed $6,000 millions in a year, equal to about 10 per cent. of the total retail sales.

Foreign Trade

World-wide economic dislocation and rapidly-falling prices combined to reduce the volume and value of the United States imports and exports in 1930 to a remarkable extent. The imports declined from $4,399 millions to $3,061 millions, or by 30 per cent., while exports fell from $5,241 millions to $3,843 millions, or by 27 per cent. The report does not give details of the electrical trade, but in our issue of March 27th (p. 565) we showed that the total value of American exports of electrical machinery and apparatus fell from $130 millions to $119 millions, or 8.5 per cent., which compares very favourably with the fall in the general total. The decline continued during the first two months of this year.

Electrical Exports to Great Britain

A recent issue of *Commerce Reports* contained an article on the British market for American electrical machinery, in which it was stated that the total value of American electrical exports to this country last year was $9,663,593. (The Board of Trade reported a figure of £8,849,000 as the aggregate value of British electrical imports during the year.) Electric motors, principally direct-current, are said to be the principal item in this trade, and the volume has shown a considerable expansion in recent years. While the American exports of a.c. motors to this country have trebled in value since 1925, they now amount to only one-fourth of the trade in d.c. motors. The bulk of the motors in question are of the fractional-h.p. class; business in the larger sizes is said to be restricted, as British and European motors compare more favourably with their American counterpart than do the smaller patterns. The American trade in railway motors has practically disappeared. The United States claims to dominate the control and switchgear import trade of this country, supplying about 86 per cent. of the whole in 1929. The generators supplied to Great Britain, similarly to the motors, are mainly low-powered units; the United States supplies only small quantities of convertors and transformers. It is claimed that American electrical machinery has found favour in this market because of its high quality and in spite of its higher cost, and it is also stated that it is securing an increasingly greater proportion of the trade from Continental competitors.

The Electric Power Industry

The production of electric power in the United States held up very well during the slump period, partly on account of the sustained demand from electrical transport concerns and partly because of the steady consumption of private users. There are at present about 20 million domestic consumers whose purchases last year amounted to over 11,000 million kWh at a total cost of $670 millions, representing an average price of less than 6 cents per kWh. The total output of electrical energy for the year by public utility plants and electric railways is estimated at 95,638 million kWh, or only 2 per cent. less than the peak year of 1929, and the rapid progress of the industry may be gathered from the fact that in the last-mentioned year electricity generated in the country for public use was more than 20 times as great as in 1902, while the population increase in the same period was only 53 per cent. Electrified power equipment in the country's factories amounted in 1927 to about 70 per cent. of the total of all power equipment, and the tendency towards industrial electrification is still growing. Railway electrification has also made a notable advance and is proceeding steadily. It is looked to as a factor of increasing promise in the electrical industry for many years to come. About two-thirds of the electricity used in the United States is steam generated. Its cost has been considerably reduced in the past few years owing to improved technical efficiency and low coal prices. During 1930 over $800 millions was expended on additions to the generating capacity and the extension of transmission lines.

Foreign Electrical Investments

There has been a remarkable expansion during the last few months in the investment of American capital in electrical enterprises in foreign countries. The American and Foreign Power Co., Inc., itself an associate of the powerful management concern known as the Electric Bond and Share Co., controls subsidiary operating units in 11 Latin-American countries. It owns a 50 per cent. interest in the Tata Hydro-Electric Agencies, Ltd., of Bombay, and has important investments in public utility corporations in China, Japan, Italy, France, Germany, and Canada. Another strong concern, the Utilities Power and Light Corporation associated in the Chase National Bank group with the United States Electric Power Corporation, is reported to control units grouped under the Greater London and Counties Trust, Ltd., and to have acquired in 1929 an interest, probably a controlling one, in two English provincial companies. Further foreign investments of a like character are contemplated for the near future and they are of great importance to American export trade, providing as they do foreign outlets of increasing value for American manufacturers of electric motors, generators, transformers, cables, wiring and other equipment.

Prospects for British Trade

With regard to the position of British trade with the United States, it is thought that the effects of the new tariff schedule cannot be accurately gauged, but it will probably result in discouraging United Kingdom exporters. The money value of British exports to the United States is high, but the range of goods for which a market exists is somewhat limited. There is only scope for high-grade manufactured goods, the demand for which arises from their exclusiveness, novelty, quality, style or some other such special attraction. It is recommended that American conditions and requirements should be thoroughly studied by principals of concerns who wish to do trade in the country. As a visit to the United States can usually be arranged in conjunction with a tour of the valuable Canadian market, the time and money expended should be well recompensed. Indiscriminate advertising is to be deprecated in a country where so much advertising is done; all efforts of this kind should be properly directed towards likely customers. The fact is stressed that, in spite of a multitude of trade barriers, the United States is still the greatest foreign market for British goods, and is only exceeded in the Empire by India and Australia.

Domestic Consumption in the United States

The Statistical Research Department of the American National Electric Light Association estimates that in 1930 domestic consumers of electricity in the United States used 11,077 million kWh. Of this, electric ranges were responsible for the consumption of 1,710 million kWh, it being estimated that there are 855,000 of these appliances in use; the average rate is put at 2.5 cents per kWh. Next in order come refrigerators. There is estimated to be 1,800,000 of these, and their consumption during 1930 was about 1,080 million kWh, at an average rate of 4.5 cents per kWh. Flat irons predominate in number (there are said to be 13,500,000), and a consumption of 675 million kWh is attributed to them. The fourth appliance on the list is the radio set, and it is surprising to learn that the 5,600,000 sets in use had an estimated consumption of 504 million kWh at an average rate of 6.1 cents per kWh. The number of water heaters connected is computed at only 155,000; these had a consumption of 465 million kWh, the average charge per kWh being 2.0 cents. The estimated consumption of 6,350,000 vacuum cleaners was 228.6 million kWh—average rate 6.1 cents per kWh. Altogether the thirteen kinds of appliance specified consumed 5,380 million kWh, which is stated to be an advance of 23.5 per cent. upon the 1929 figure, although, owing to reductions in rates, the revenue has only risen by 18 per cent.

The Import Trade of Siam

THE following figures, showing the imports of electrical and allied goods into Siam during the year ended March, 1930, are taken from the recently-issued official trade statistics; the figures for the year ended March, 1929, are included for the purposes of comparison, and notes of any increases or decreases are given. Imports stated to be from Singapore and Hong-Kong are for the most part the products of other countries shipped *via* these two ports.

It will be seen that Great Britain's share of the trade in electrical goods and apparatus has declined somewhat. On the other hand imports of British railway and tramway rolling stock show a great increase.

	1928-29. Bahts. (Thous.)	1929-30. Bahts. (Thous.)	Inc. or dec. Bahts. (Thous.)
Electrical goods and apparatus, including machinery—			
Total	3,782	4,650	+868
From United Kingdom ...	1,064	770	−294
,, Germany	456	950	+494
,, United States ...	477	970	+493
,, Singapore	227	390	+163
,, Sweden	22	105	+ 83
,, Italy	23	17	− 6
,, Holland	98	95	− 3
,, France	76	80	+ 4
,, Japan	277	160	−117
Lamps—			
Total	630	660	+ 30
From Singapore	56	25	− 31
,, United Kingdom ...	30	30	—
,, Japan	11	90	+ 79
,, Germany	455	430	− 25
,, Sweden	—	40	+ 40
Scientific instruments and apparatus—			
Total	330	420	+ 90
From United Kingdom ...	81	90	+ 9
,, Germany	119	120	+ 1
,, France	5	30	+ 25
,, Japan	20	75	+ 55
,, United States ...	61	60	− 1
,, Singapore	26	20	− 6
Prime movers, other than locomotives, marine, military, and agricultural machinery—			
Total	1,576	1,153	−423
From United Kingdom ...	397	395	− 2
,, United States ...	731	395	−336
,, Germany	267	280	+ 13
,, Sweden	155	22	−133
Machinery, unenumerated, including detached parts, and not including agricultural, textile, or sewing machines—			
Total	2,157	2,860	+703
From United Kingdom ...	680	920	+240
,, United States ...	428	390	− 38
,, France	94	40	− 54
,, Denmark	42	340	+298
,, Germany	338	490	+152
Cars or trucks for railways or tramways—			
Total	1,067	2,940	+1,873
From United Kingdom ...	195	1,840	+1,645
,, United States ...	26	8	− 18
,, Belgium	770	1,010	+240
,, Germany	69	70	+ 1
Rubber manufactures, other than tires—			
Total	829	960	+131
From Singapore	455	290	−165
,, United Kingdom ...	107	95	− 12
,, United States ...	16	30	+ 14
,, Japan	9	190	+181
,, Germany	43	95	+ 52

NOTE.—Baht = 1s. 10½d.

Business conditions generally in Siam are little better than in most other parts of the world. For the purpose of stimulating trade and tiding over the depression, a reduction in rates on the State Railways came into operation on April 1st; these in some cases amount to 50 per cent. Reporting about the middle of April, the American Commercial Attaché in Bangkok states that the credit situation and collections have become more difficult, especially in up-country districts, and importers and dealers are reluctant to grant credit for new purchases. Rice exports have been increasing in both volume and value, but the average price has been lower. The Government budget for the fiscal year beginning on April 1st placed expenditure at 94,346,000 bahts, representing a reduction of 12,880,000 bahts on the previous year; a surplus of about 460,000 bahts is estimated.

The Electrical Imports of Ceylon

THE following table shows the value of Ceylon's imports (including Government stores) of electrical and allied materials during last year. The figures have been taken from the recently-published official returns. The corresponding statistics for 1929 have been added, and notes of decreases or increases are also given.

	Rupees. 1929.	Rupees. 1930.	Rupees. inc. or dec.
Control and switchgear—			
Total, mainly from U.K. ...	34,000	119,000†	+ 85,000
Generators, alternators and dynamos—			
Total	132,000	214,000	+ 82,000
From United Kingdom ...	124,000	190,000	+ 66,000
,, Germany	4,000	21,000	+ 17,000
,, United States ...	500	2,000	+ 1,500
Motors—			
Total	83,000	99,000	+ 16,000
From United Kingdom ...	58,000	72,000	+ 14,000
,, United States ...	22,000	23,000	+ 1,000
Transformers and convertors—			
Total all from U.K.	120	147,000	+146,880
Magnetos, ignition—			
Total, all from U.K. ...	253	36	− 217
Magnetos, road—			
Total	6,500	5,600	− 900
From United Kingdom ...	5,900	3,100	− 2,800
,, United States ...	600	2,500	+ 1,900
Electric wires and cables (insulated)—			
Total	715,000	880,000	+165,000
From United Kingdom ...	696,000	834,000	+138,000
,, Germany	4,600	24,000	+ 19,400
,, United States ...	400	200	− 200
,, Holland	5,700	16,500	+ 10,800
Electrical machinery not elsewhere specified—			
Total	908,000	711,000	−197,000
From United Kingdom ...	469,000	524,000	+ 55,000
,, Germany	202,000	62,000	−140,000
,, United States ...	62,000	103,000	+ 41,000
,, Italy	*	10,000	
Telegraph and telephone instruments and apparatus—			
Total	458,000	394,000	− 64,000
From United Kingdom ...	410,000	346,000	− 64,000
,, United States ...	5,000	2,500	− 2,500
,, Sweden	900	600	− 300
,, Germany	21,800	21,500	− 300
Electric lighting accessories and fittings, including switches—			
Total	694,000	680,000	− 14,000
From United Kingdom ...	401,000	375,000	− 26,000
,, Germany	51,000	43,000	− 8,000
,, United States	167,000	173,000	+ 6,000
,, Holland	32,500	51,000	+ 18,500
Electrical goods and apparatus not elsewhere specified—			
Total	738,000	848,000	+110,000
From United Kingdom ...	540,000	766,000	+226,000
,, India	21,400	7,000	− 14,400
,, France	500	1,200	+ 700
,, United States ...	120,000	19,000	−101,000
,, Germany	39,000	38,000	+ 1,000

* Figures not available. † Rs. 22,000 from Germany.

Trade with Mexico

A confidential memorandum on methods of trading and the appointment of agents in Mexico, prepared by the British Consul-General at Mexico City, has been received in the Department of Overseas Trade and issued to firms whose names are entered on its Special Register. British firms desirous of obtaining a copy of this memorandum should apply to the Department at 35, Old Queen Street, S.W.1. (Reference C.X. 3535.)

In the same connection, the Department has published "Hints for Commercial Visitors to Mexico" (Ref. No. C.3531), containing a great deal of information likely to prove of service to visitors to the Republic. Particulars of communications, hotel accommodation, climate, &c., are given.

Parliamentary Notes

[By our Special Parliamentary Reporter]

Authorised Electricity Distributors

On May 19th MR. BARNES asked the Minister of Transport how many authorised distributors of electricity there were in the country at the present time.

MR. MORRISON said that there were 665 separate authorised undertakers at the present time in Great Britain.

Central Board Contracts

On May 19th MR. CHATER asked what was the total value of the contracts placed to date by the Central Electricity Board.

MR. MORRISON said he understood that the contracts placed by the Board to the end of April, 1931, amounted to approximately £19,500,000. This figure did not include expenditure on standardisation of frequency in connection with which the Board had specifically approved expenditure estimated to amount to £5,250,000.

Young Persons in Industry

On May 19th MR. THORNE asked the Minister of Labour if she was aware of the increasing proportion of young persons, male and female, employed in the engineering and shipbuilding industries; and could she state the numbers of young persons at present employed in these industries in proportion to the adult male workers.

In her reply, MISS BONDFIELD gave particulars of the proportions of men, boys, women and girls in each section of the engineering industry. The percentages for the electrical engineering branch were as follows: In 1923: Men 72.7, boys 7.4, women 16.5, and girls 3.4. In 1930: Men 70.2, boys 7.7, women 18.3, and girls 3.8.

Farmers and the Grid

On May 20th MR. STUART BEVAN asked the Minister of Transport whether he would take steps to secure that where the Electricity Commissioners obtained wayleaves over a farm for the high-pressure grid, provision should be made whereby the farmer might be provided with suitable power at a reasonable cost.

MR. MORRISON said that the high-pressure lines of the Central Electricity Board were necessary for the purpose of interconnecting the principal generating stations and for technical reasons they were not available for connections to individual consumers. These lines, however, formed part of the system which would afford supplies to the local undertakings which were responsible for the low-pressure distribution to consumers, and would facilitate the provision of supplies wherever a remunerative demand existed.

The North-East England Scheme

On May 20th SIR NICHOLAS GRATTAN-DOYLE asked the Minister of Transport if he would state what was the present position in regard to schemes for the North-East of England under the Electricity (Supply) Act, 1926; whether the material being used was British and so far as possible produced within the area; how many persons were employed; and from what areas they were drawn.

MR. MORRISON said that he understood from the Central Electricity Board that the scheme for North-East England under the 1926 Act was progressing favourably. The materials being used were all British, and so far as possible, were produced within the area. No useful figures could be given regarding the numbers of persons employed, since these varied from week to week, in accordance with the actual work being carried out. The unskilled labour required was drawn, so far as possible, from within the area.

Automatic Traffic Signals

On May 20th MR. MORRISON informed Mr. Day that the total number of installations of automatic coloured-light traffic-control signals approved up to April 30th, 1931, was 333.

The Post Office and Telegraph Bill

When the House of Commons went into Committee on this Bill last week, MAJOR COLFAX moved to reduce the sum to be appropriated for telephone development from £32,000,000 to £25,000,000 on the ground that it was "reckless extravagance" to embark upon expenditure which would not bring an immediate, direct, and substantial return. Capt. Crookshank supported the amendment, but Viscount Wolmer, while agreeing that the telephone service was not being developed as it ought to be, said that he could not agree to any proposal to reduce the amount available for the Post Office. The Postmaster-General said that he could not accept the amendment, and it was negatived by 114 votes to 44.

The Bill later passed its third reading.

The Factories Bill

On May 21st, in reply to a question by Sir Kingsley Wood, MR. CLYNES (Home Secretary) said that although the Government was anxious to proceed with the Factories Bill during the present session, he was afraid that having regard to the amount of legislation to which the Government was committed and the present state of Parliamentary business, postponement was inevitable.

Closed Generating Stations

On May 21st, MR. BARNES asked the Minister of Transport how many generating stations had been closed in consequence of the operation of the Electricity Supply Act, 1926; and how many remained.

MR. MORRISON said that the number of generating stations of authorised undertakers in operation at April 1st, 1927, was 459, and at December 31st, 1930, 473. During the period April 1st, 1927, to December 31st, 1930, 86 stations had been shut down. The effect of the Electricity (Supply) Act, 1926, in regard to the shutting down of stations could only be realised when the schemes for the various areas under the national scheme had commenced actively to operate. At the present time only one such scheme had come into active operation. The passage of the Act of 1926 had, however, already had the effect of limiting extensions to stations other than those required for the purposes of the national scheme.

Legal

The Metropolitan-Vickers Co. and a Debtor

IN the Shoreditch County Court last week, before Judge Cluer, the Metropolitan-Vickers Electrical Co., Ltd., sought to enforce the payment of a judgment debt of £14 against Sidney B. Lunzer, Cranwich Road, Stoke Newington, N., a metal merchant.

The plaintiffs did not appear, but the defendant attended, and MR. ASHE LINCOLN, who appeared for him, said that the defendant had intended to make an offer in connection with this debt which might have satisfied the plaintiffs, but as they were not there he could do nothing. Owing to the heavy slump in the price of metals, the defendant found himself saddled with debts to the amount of £4,000. He was intending to make an arrangement with his creditors, in which case, of course, the plaintiffs would come in.

Judge CLUER asked counsel what would happen if the plaintiffs did not agree to a composition. He had always thought that if a composition were made with creditors, and one of them did not agree, he had every right to enforce it in full if he wanted to.

MR. LINCOLN said that that was the true interpretation of the law, but Judge Cluer pointed out that the Divisional Court had found differently on an appeal from the Whitechapel County Court. In this case, as the plaintiffs had not attended, they would have to allow the defendant his expenses, amounting to 10s. 6d.

Cork Electricity Supply Co., Ltd. v. Concannon and others

JUDGMENT was delivered in this case by the Supreme Court of the Irish Free State on May 20th. The defendants appealed from a judgment in favour of the plaintiffs by Mr. Justice Johnston, who held that the preference shareholders, represented by Mr. E. G. Concannon, were not entitled to participate rateably with the ordinary shareholders (represented by the British Thomson-Houston Co., Ltd.) in the event of winding up or the capitalisation of certain surpluses. The defendants asked the Supreme Court to set aside this judgment and to make a declaration that the preference shareholders were entitled to participate in such a distribution. The Chief Justice, after dealing with the legal aspects of the matter, stated that in his opinion the appeal should be allowed with costs. Mr. Justice Fitzgibbon and Mr. Justice Murnaghan concurred and judgment was entered accordingly.

New Revolving Light Beacons

A new type of revolving beacon, having two 36-in. lenses, is being introduced into lighthouses following its satisfactory use for airway lighting purposes. The new beacons, of weather-proof construction, lend themselves to installation on skeleton steel towers. The motor which revolves the beacon producing the flashes is contained within the base, and the entire beacon is so constructed that it will operate for long periods without attention. Electricity is used both for illuminating and for driving the motor. The possibility of the light failing through the burning out of a lamp is guarded against by a lamp-changing device. With a 1,000-watt lamp the new beacons send out a beam of 1,200,000 candle-power, and with simple alterations the light may be made alternating white and red, white and green, or red and green. The speed of revolution may also be varied between two and six revolutions a minute.—*Reuter's Trade Service* (New York).

Television Experiment

Characters on a television screen exchanged conversation with an audience during a demonstration arranged by the American General Electric Company. Life-sized images of speakers addressing the Rotary Club were projected on a screen, the speakers making their addresses in a booth at a laboratory some distance from the hall in which the audience was seated. Microphones installed in the hall enabled the speakers to hear what members of the audience said. The advantage of the system, it was explained, was that a lecturer would not only be able to deliver an address to an audience miles away, but would also be in so close touch as to be able to answer questions.—*Reuter* (New York).

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

The E.H.P. Conference

My attention has been drawn to your article on page 833 of your issue dated May 15th, 1931, in regard to the above Conference to be held in Paris in June, in which it states that application for registration should be made to Monsieur Tribot Laspière, Paris.

I am desired to point out that the Institution has set up a British National Committee of the Conference which deals with all matters relating to the presentation of papers and the registration of members from this country. Monsieur Laspière is fully cognisant of this Committee, and anyone desiring to attend the Conference from this country should therefore register through me.

P. F. ROWELL,
Secretary, Institution
London, W.C.2, *May 20th*, 1931. of Electrical Engineers.

"Use Bakelite"

I am extremely obliged for the detailed information so kindly given in answer to my enquiry by Mr. A. O. Hinchliff and Mr. S. J. Philpot. Mr. Hinchliff has given some very useful information that bears out my own observations of the commutators as I received them; I refer to hot bars and high segments. In five cases of small commutators, three had high bars and the remaining two showed signs of overheating. In the case of the overheating, the other trouble was expected; upon testing these commutators, however, they were found to be sound, and this was puzzling for the moment. The coils were then tested and found to be in order, and the conclusion arrived at was that the heating was due to faulty soldered connections. The coils were re-connected, the commutator skimmed, and the machine again tested and put into service; it now seems that in due course it will return with further defects. The method adopted to repair the tracking faults was to machine out the faulty insulation and simply varnish overall.

The point mentioned by Mr. Philpot regarding soldering fluxes and overheating during soldering are worthy of note. In referring to flux, I take it Mr. Philpot refers to fluxes containing acids and that he does not include resin, as no fluxes, apart from resin, should come into the soldering of armature connections.

Enfield, *May 22nd*, 1931. G. W. COOPER.

Mr. G. W. Cooper would not have experienced the trouble he mentions had the commutators been properly assembled and moulded. In regard to the smell of carbolic acid given off when under heat, this is conclusive evidence that they were not moulded at the correct temperature, and were not given enough time in the mould to "cure." If the copper and mica are assembled *under pressure*, and a suitable grade of "Bakelite" used, and moulded up solid, with or without metal reinforcing rings, a highly satisfactory commutator is produced which will stand a high temperature without softening, distorting, or giving off odours; at the same time, such a commutator can be run at high speeds and is eminently suitable, more especially for small machines.

I think that the root of the trouble is that some motor manufacturers place orders at cut prices, and consequently the production of the commutators is speeded up to meet the price, and hence the trouble.

A commutator, properly designed, made with "Bakelite" moulded solid ends, and with brass or steel centre sleeve, should be highly satisfactory (more especially for small sizes) and in every way suitable for working under most adverse conditions.

MICA MANUFACTURING CO., LTD.
P. Freeman,
London, S.E., *May 26th*, 1931. *Managing Director.*

A Pioneer in Wireless

Under the above heading your correspondent, Mr. H. R. Kempe, makes some statements regarding the early work of Prof. Hughes.

I trust the following extract from a letter which passed between Mr. J. J. Fahie and Prof. Hughes will help to make this matter clear (from *Signalling Through Space Without Wires*, by Sir Oliver Lodge):—

"Reply from Prof. D. E. Hughes, 40, Langham Street, W., April 29, 1899. Dear Sir,—In reply to yours of the 26th inst., in which you say that Sir William Crookes has told you 'that he saw some experiments of mine on aerial telegraphy in about December, 1879, of which he thinks I ought to have published an account,' and of which you ask for some information, I beg to reply with a few leading experiments that I made on this subject from 1879 up to 1886. . . . In December, 1879, I invited several persons to see the results then obtained. Amongst others who called on me and saw my results were: December, Mr. W. H. Preece, F.R.S., Sir William Crookes, F.R.S., and others. February 20, 1880, Mr. Spottiswood, Pres. R.S., Prof. Huxley, F.R.S., Sir George Gabriel Stokes, F.R.S.

"They all saw experiments upon aerial transmission, as already described by means of the extra current produced by a small coil and received upon a semi-metallic microphone, the results being heard upon a telephone in connection with the receiving microphone. The transmitter and receiver were in different rooms, about 60 ft. apart. After trying successfully all distances allowed in my residence in Portland Street, my usual method was to put the transmitter in operation and walk up and down Great Portland Street with the receiver in my hand, with the telephone to the ear.

"The sounds seemed to slightly increase for a distance of 60 yards, then gradually diminish, until at 500 yards I could no longer with certainty hear the transmitted signals. . . . The President of the Royal Society, Mr. Spottiswood, together with the two hon. secretaries, Prof. Huxley and Prof. G. Stokes, called upon me on February 20, 1880, to see my experiments upon aerial transmission of signals. The experiments were most successful, and at first they seemed astonished at the results, but towards the close of three hours' experiments Prof. Stokes said, 'that all the results could be explained by known electromagnetic induction effects, and therefore he could not accept my view of actual aerial electric waves unknown up to that time, but thought I had quite enough original matter to form a paper to be read at the Royal Society.'

"I was so discouraged at being unable to convince them of the truth of these aerial waves that I actually declined to write a paper on the subject until I was better prepared to demonstrate the existence of these waves. . . . The triumphant demonstration of these waves was reserved to Prof. Hertz, who by his masterly researches upon the subject in 1887-9 completely demonstrated their existence. . . I then felt it was now too late to bring forward my previous experiments, and through not publishing my results, and means employed, I have been forced to see others remake the discoveries I had previously made as to the sensitiveness of the microphonic contact, and its useful employment as a receiver for electric aerial waves. Amongst the earliest workers in the field of aerial transmission I would draw attention to the experiments of Prof. Henry, who describes in his work, published by the Smithsonian Institute, Washington, D.C., U.S.A., Vol. I, p. 203 (date unknown, probably about 1850), that he magnetised a needle in a coil at 30 ft. distance, and magnetised a needle by a discharge of lightning at eight miles distant.

"Yours &c., D. E. HUGHES."

There are several statements by your correspondent at variance with those given above, and further details would be of interest. ARTHUR S. SUTHERLAND.

Glasgow, C.4, *May 24th*, 1931.

Electricity in Art

Cable makers may be interested to know that a cable drum is shown for the first time in a picture at the Royal Academy. This is No. 809, "The Overman," which shows the lunch hour, evidently at a cable-laying job, and the foreman is putting away his bread and cheese, *al fresco*.

May 26th, 1931. J.H.C.B.

Insulating Oils

The "Effect of Carbon-black on Insulating Oils" is the subject of an article by Messrs. W. B. Wiegand, C. R. Bloggs and D. W. Kitchin, a reprint of which in booklet form is issued by Binney & Smith & Ashby, Ltd., 17, Laurence Pountney Lane, E.C.4, producers of "Micronex W 5" (active carbon-black), who will be pleased to send copies of the booklet to interested firms. Some of the authors' conclusions are: New transformer oils, when treated either by filtration or by sedimentation with dried carbon black of suitable quality, have shown an average improvement in dielectric strength of 40 per cent.; such treatment has been found more effective than that with metallic sodium; active carbon black tends to remove moisture, electrolytes, and suspended particles; the importance of substantial removal of carbon black after treatment is shown by data on power factor of various carbon blacks in oil mixtures; the effectiveness of carbon-black treatment of insulating oils is at its maximum at the lower temperatures; active carbon black, such as "Micronex," has great avidity for water and is able to deprive suspended moist whiting of its water; the transfer of water in a mix from the whiting, where it gives large power factor, to the carbon black, where its effect is negligible, produces a striking decrease in the power factor of the mix.

I.E.E. North-Eastern Centre

The annual report shows that ten ordinary meetings were held during the 1930-31 session at which the average attendance was 88, as compared with 73; several local authors received premiums for papers. The Faraday lecture was attended by 277 people, of whom 55 were members. The membership increased by 29 to 558. The Tees-side Sub-Centre, which held seven meetings, has 20 per cent. of the total membership. The first annual dinner and dance was attended by 238 members and 30 guests.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1929

34,910. "Electric terminals." P. J. De Wet. March 5th, 1930. (347,765.)

38,879. "Automatic protection of electrical transmission systems, particularly four-phase five-wire systems." A. M. Taylor. December 19th, 1929. (Cognate applications, 689/30, 1,518/30 and 26,499/30.) (347,616.)

39,800. "Electromagnetic interrupter apparatus." Eclipse Aviation Corporation. January 5th, 1929. (347,726.)

1930

1,774. "Controlling means for a variable electrical element." Gramophone Co., Ltd., and G. E. Condliffe. January 17th, 1930. (347,621.)

2,400. "Radio signalling systems." Soc. Française Radio-Electrique. January 26th, 1929. (347,629.)

2,402. "Rotating-iron electrical measuring instruments." Siemens & Halske Akt.-Ges. February 7th, 1929. (347,595.)

2,653. "Inductance for motor control." J. W. Geddes, and G. R. Hook. January 25th, 1930. (347,599.)

2,899. "Electrical distant indicating apparatus." Schneider et Cie. April 29th, 1929. (Addition to 245,761.) (347,604.)

2,905. "Electrical devices for indicating the direction of rotation or of movement of a machine part." A. Graham & Co., Ltd., and C. H. Vaughan. January 28th, 1930. (Cognate application, 20,774/30.) (347,739.)

2,918. "Electrical switches or circuit-breakers." G. E. Whitehead, and Whitehead's Electrical Inventions, Ltd. January 28th, 1930. (347,606.)

2,919. "Electrical signalling systems for elevators." Westinghouse Electric & Manufacturing Co. January 28th, 1929. (347,707.)

2,920. "Electric glow discharge lamps." Westinghouse Electric & Manufacturing Co. February 5th, 1929. (347,607.)

2,930. "High-speed telegraph systems." Telefunken Ges. für Drahtlose Telegraphie. March 13th, 1929. (347,683.)

2,937. "Electric control devices." C. W. Kuhn. August 19th, 1929. (347,608.)

2,957. "Electric glow discharge devices." British Thomson-Houston Co., Ltd. January 28th, 1929. (347,684.)

3,054. "Television and like apparatus." J. L. Baird, and Television, Ltd. (in liquidation). January 29th, 1930. (Cognate application 31,203/30.) (347,741.)

3,072. "Incandescent electric lamps." J. Van Eck, and H. Fekkes. November 22nd, 1929. (347,636.)

3,083. "Telecommunication systems." G. Viard. February 15th, 1929. (347,687.)

3,114. "Wireless receiving apparatus." J. Robinson. January 29th, 1930. (347,638.)

3,384. "Printing telegraph systems and the like." Siemens and Halske Akt.-Ges. April 15th, 1929. (Addition to 39,618/29.) (347,744.)

3,408. "Vacuum or gasfilled electric switches." Scherbius and Ritter, and L. Scherbius. February 18th, 1929. (347,746.)

3,540. "Electrical switches." C. McKendrick. February 3rd, 1930. (347,747.)

3,616. "Electromagnetic switches." A. West & Co., Ltd., and F. J. Callingham. February 3rd, 1930. (347,751.)

3,619. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., and H. Orchard. February 3rd, 1930. (347,752.)

3,620. "Electric heating elements." Edison Swan Electric Co., Ltd., W. E. Hankins, and F. Shergold. February 3rd, 1930. (347,753.)

3,759. "Methods of insulating wire." International General Electric Co., Inc. February 4th, 1929. (347,757.)

3,813. "Wireless apparatus for protection against theft and fire." M. A. J. Chardin. February 15th, 1929. (347,761.)

4,154/5. "Electric switchgear." A. Reyrolle & Co., Ltd., and J. Christie. February 7th, 1930. (347,769/70.)

4,590. "Apparatus for indicating the electrical state of the atmosphere." R. I. Wells, and N. Cox-Walker. February 11th, 1930. (347,780.)

4,742. "Electric road traffic signalling systems and circuit controllers therefor." British Thomson-Houston Co., Ltd. February 12th, 1929. (347,782.)

4,795. "Ignition systems for internal-combustion engines." R. L. Aspden. February 12th, 1930. (347,784.)

5,452. "Protective devices for electric circuits." British Thomson-Houston Co., Ltd. February 19th, 1929. (347,795.)

6,400. "Arrangements for preventing the corrosion of metal-vapour rectifiers." Fusi Denki Seizo Kabushiki Kaisha. February 27th, 1929. (347,801.)

6,735. "Electromechanical resonators and the like." Marconi's Wireless Telegraph Co., Ltd. April 8th, 1929. (347,804.)

7,553. "Electric lamps for use in mines and other places." Oldham & Son, Ltd., and H. G. Darby. March 7th, 1930. (347,811.)

7,766. "Methods of and arrangements for the maintenance of telecommunication lines." G. Viard. March 23rd, 1929. (347,814.)

7,923. "Electric cables." Callender's Cable & Construction Co., Ltd., and L. G. Brazier. March 11th, 1930. (347,819.)

8,406. "Means for controlling electric motors." Clarke, Chapman & Co., Ltd., and A. Read. March 15th, 1930. (347,824.)

9,282. "Sound transmitters." Electroacustic Ges. March 26th, 1929. (347,831.)

9,379. "Portable electric lamp." J. Kremenezky (firm of) and K. Blitz. April 3rd, 1929. (347,833.)

9,828. "Electromagnetic friction device." W. W. Triggs (Warner Electric Brake Corporation). March 27th, 1930. (347,841.)

11,345. "End connectors for electric conductors." E. M. Coudeu, and E. Deschamps. July 2nd, 1929. (347,855.)

11,730. "High-tension electric insulators especially for exposed conductors." W. Schabelitz. April 14th, 1930. (347,858.)

12,109. "Short-wave radio receivers." Telefunken Ges. für Drahtlose Telegraphie, and W. Ludenia. April 24th, 1929. (347,865.)

12,139. "Electrical tumbler switch." W. J. Charles and A. Watson. April 17th, 1930. (347,866.)

12,481. "Ohmmeters." G. de Faultrier. April 22nd, 1930. (347,869.)

13,747. "Electrical generating systems." Eclipse Aviation Corporation. May 28th, 1929. (347,889.)

14,612. "Thermally-operated overload cut-out arrangements for regulating resistances." Siemens-Schuckertwerke Akt.-Ges. May 13th, 1929. (347,897.)

15,663. "Electromagnets." S. Dunlop (Fuld & Co. Telephon- und Telegraphenwerke Akt.-Ges.). May 21st, 1930. (347,910.)

16,182. "Battery charging." Siemens-Schuckertwerke Akt.-Ges. May 30th, 1929. (347,920.)

16,327. "Lampholders for electric lamps." General Electric Co., Ltd., and F. G. Quance. May 27th, 1930. (347,921.)

16,368. "Multiple pole compressed-air blow-out electric switch." Siemens-Schuckertwerke Akt.-Ges. December 20th 1929. (347,922.)

17,028. "Submarine electric cables for carrier-frequency telegraphy." Norddeutsche Seekabel-werke Akt.-Ges. June 1st, 1929. (347,929.)

17,071. "Electric insulators." Soc. Ceramica R. Ginori. October 3rd, 1929. (347,930.)

17,146. "Interlock electric switch device for manually- and electrically-operated valves and sluices." Glenfield & Kennedy, Ltd., and E. B. Ball. June 4th, 1930. (347,932.)

17,269. Receiving apparatus for carrier-frequency telegraphy." Siemens & Halske Akt.-Ges. June 17th, 1929. (347,936.)

19,250. "Radio-signalling systems." Telefunken Ges. für Drahtlose Telegraphie. July 6th, 1929. (347,956.)

19,474. "Automatic circuit-breakers for house wiring." International General Electric Co., Inc. June 29th, 1929. (347,959.)

21,857. "Electric connection boxes for cargo clusters, portable lamps and such like." W. Gray, G. F. Mackay, and Telford, Grier and Mackay, Ltd. July 19th, 1930. (347,978.)

22,663. "Sparking plugs for internal-combustion engines." Eclipse Aviation Corporation. August 8th, 1929. (347,979.)

22,822. "Winding control systems." G. R. Shepherd (Westinghouse Electric & Manufacturing Co.). July 29th, 1930. (347,980.)

23,383. "Signalling apparatus." R. Bosch Akt.-Ges. August 7th, 1929. (347,983.)

23,862. "High-frequency receivers." Telefunken Ges. für Drahtlose Telegraphie. August 20th, 1929. (347,984.)

24,123. "Induction furnaces." Associated Electrical Industries, Ltd. August 14th, 1929. (347,986.)

24,212. "Light-producing apparatus for stroboscopic and like devices." Westinghouse Electric & Manufacturing Co. August 14th, 1929. (347,988.)

25,163. "Testing instruments for radio transmitting apparatus." British Thomson-Houston Co., Ltd. August 22nd, 1929. (347,991.)

26,823. "Electric leading-in insulators." Porzellanfabrik P. Rosenthal & Co. Akt.-Ges. April 17th, 1930. (347,998.)

27,157. "Operating mechanism for electric circuit-breakers." British Thomson-Houston Co., Ltd. September 11th, 1929. (347,999.)

30,734. "Electrical sound-reproducing apparatus." W. L. Colassi. January 29th, 1930. (Divided application on 24,553/29.) (347,642.)

31,001. "Adjusting devices for lighting fixtures." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. November 30th, 1929. (348,005.)

33,090. "Electrical heating units." G. Bray & Co., Ltd., and G. Bray. February 8th, 1930. (Divided application 4,298/30.) (348,007.)

1931

51. "Electric furnaces." W. W. Triggs (St. Joseph Lead Co.). December 17th, 1929. (Divided application on 38,630/29.) (347,718.)

Trade Mark Applications

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from May 20th, 1931:—

Emud (lettering and design). No. 520,623. Class 8. Radio-telephonic receiving sets.—Emkabe Radio Gesellschaft, Berlin. (British representative: A. A. Thornton, 7, Essex Street, Strand, W.C.2.)

Extenser. No. 520,940. Class 8. Electric condensers and radio-telephonic receiving sets.—Amalgamated Press, Ltd., Fleetway House, Farringdon Street, E.C.4.

Primrose (lettering and design). No. 521,164. Class 8. Radio-telegraphic and telephonic apparatus and parts thereof, and dry batteries and cells not for medical purposes.—N. Stanley, 8, Cranbrook Road, Ilford.

The Golden Pigeon Brand (lettering and design). No. 521,550. Class 8. Apparatus for use in radio-telephony.—Z. L. Amelon, 83, Elizabeth Street, Cheetham, Manchester.

Meridian. No. 521,865. Class 8. Radio-telephonic and telegraphic apparatus and parts thereof, and dry batteries and cells not for medical purposes.—Elektro-Chemische Fabrik Alfred Baehr Gesellschaft, Berlin. (British representative: D. Grabow, 19, Minster Road, N.W.2.)

Ringlite. No. 515,077. Class 13. Electric switches (ordinary).—A. H. Scott, 32, Broxton Avenue, West Kirby, Cheshire.

Concordia (lettering and design). No. 520,115. Class 13. Electric lamps (ordinary).—Concordia Electric Safety Lamp Co., Ltd., Tredegar Street, Cardiff.

Mirak. No. 521,705. Class 13. Sparking plugs.—R. Bishop, 1, Mathias Road, East Molesey, Surrey.

Solon. No. 522,148. Class 13. Electric soldering irons.—W. T. Henley's Telegraph Works Co., Ltd., 11, Holborn Viaduct, E.C.1.

Sectoray. No. 519,170. Class 15. Shades and reflectors for electrical illumination made of glass.—Electrical Components, Ltd., 88-90, Great Charles Street, Birmingham.

Ultralux, No. 521,255, and Ultrastrip, No. 521,256. Class 50. Shades made of asbestos, mica or celluloid for lamps.—Troughton and Young, Ltd., 143, Knightsbridge, S.W.1.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdare (GLAM.).—Extensions, including science laboratory, Ynyslwyd school, for the E.C.; E. G. Henton, architect, 22, Cardiff Street.

Arundel (SUSSEX).—Houses (24) for the T.C.; Clare & Co., builders.

Ashley-de-la-Zouch.—Houses for the R.D.C.; J. G. Lidwell and Sons, (43); F. Perks & Son (58), builders. Wesleyan church, Measham Road, Moira; A. Brocklehurst & Co., architects, Martin's Bank Chambers, 10, Norfolk Chambers, Manchester.

Ayrshire.—Extensions, Dalry Higher Grade School, with electric lighting work, for the county E.C.; W. Reid, architect, 14, Wellington Square, Ayr.

Barking.—Shops (19), Becontree estate (£31,000); L.C.C. architect.

Bedford.—Houses (200) off London Road; borough engineer.

Bexhill-on-Sea.—Houses; A. Curram; J. Hunt; Tubbs and Messer; and E. Bunce.

Billingham.—Houses (100), Cowpen Lane (£36,554); council surveyor.

Birmingham.—Billiard hall, Stratford Road, Robin Hood; A. and J. Larkman, builders, Washwood Heath.

Blackpool.—Hospital (£100,000); secretary, Victoria Hospital. Alterations to the Trocadero Restaurant, Promenade; Sir Lindsay Parkinson & Co., Ltd., builders, Talbot Saw Mills.

Blyth.—Housing scheme, Bebside; borough surveyor.

Bournemouth.—Extensions to Tollard Royal Hotel, St. Michaels Road; Royal Hotel Co., Ltd. Additions to Victoria Hotel, Commercial Road; Eldridge Pope & Co., Ltd.

Braintree.—Houses (134) for the R.D.C.; E. O. Wheeler, surveyor, St. Peter's Close, Bocking.

Bromborough.—Wesleyan church, Rock Ferry (£3,000); trustees.

Bury (LANCS.).—Houses (120), Woodhill, for the T.C.; borough engineer.

Bury St. Edmunds.—Houses (32), Prior's Road, for the T.C.; R. H. Beaumont, borough surveyor.

Cheshire.—Council school (480 places) at Lawton Gate Church; F. A. Browne, county architect, The Castle, Chester.

Chesterfield.—Abattoir; Mr. Felgate, Keighley Corporation architect.

Chippenham (WILTS.).—Houses (32) for the R.D.C.; surveyor. Sewage disposal works; Parker Pearson & Ross Hooper, Dallas Chambers.

Cockermouth (CUMBERLAND).—Wesleyan church (£7,500); trustees.

Consett.—R.C. school; F. Coyle, architect, New Market Street.

Coventry.—Infectious diseases hospital; Medical Officer of Health.

Crewe.—Public baths (£22,600) for the T.C.; borough surveyor.

Croydon.—Houses (26), Ross Road; P. Richardson. Factory extensions, Lansdowne Road; Young & Randall.

Darlington.—Houses (100) for the T.C.; borough surveyor.

Darvel (AYRSHIRE).—Houses (32) for the T.C.; burgh surveyor.

Derby.—Wesleyan church, Litchurch (£4,000); trustees.

Devizes.—Houses (70) for the R.D.C.; surveyor.

Dunmow (ESSEX).—Houses (100) for the R.D.C.; surveyor.

Durham.—School (260 places), Kibblesworth, for the County E.C.; F. Willey, architect, 34, Old Elvet.

Easington (Co. DURHAM).—Houses (2,000) for the R.D.C.

Eastbourne.—Aerodrome; L. Thompson, town planning consultant.

Eastleigh (HANTS.).—Rebuilding cinema; proprietor.

Edinburgh.—Installation of heating system at Graiglockhart Institution; city architect, City Chambers.

Essex.—Junior school (£16,000), Laindon, and extensions to school (£5,000), Rivenhall; county architect.

Fife.—Houses (30), Kincardine, for the C.C.; county surveyor, Cupar.

Galashiels.—Housing scheme, Wood Street, burgh surveyor.

Gateshead.—Conversion of premises, High Street, into a bank; H. Kindred, builder, Sunniside.

Goole.—Houses (40), Marshfield, for the U.D.C.; surveyor.

Grimsby.—Rehousing scheme; borough engineer. Extensions to Scarthoe School (£3,656); Towle Bros., Ltd.

Guisborough (YORKS.).—Houses (20) for the U.D.C.; surveyor.

Holmsley (YORKS.).—Houses (22) for the R.D.C.; surveyor.

Helston (CORNWALL).—Houses (20) for the T.C.; borough surveyor.

Hertfordshire.—Three schools, Watford (1,050 places), for county E.C.; director of education, Hertford.

High Wycombe.—Houses (46), Micklefield Road, for D. H. E. King. Houses (114) for the T.C.; A. C. Dean, builder.

Horsforth.—Houses (66), Cragg Hill housing site; J. E. Aldersley, architect, Council Offices, Horsforth.

Houghton-le-Spring.—Houses (76) for the U.D.C. (£22,400); Goodyear & Son, 60, Claypath, Durham.

Hull.—Rope works, with electrical equipment, for D. Kellett and Son, Nottingham.

Irish Free State (BALLINA, Co. MAYO).—Cinema; T. F. McNamara & Sons, architects, 5, Dawson Street, Dublin.

Jarrow (Co. DURHAM).—Post office; H.M. Office of Works, 63, Westgate Road, Newcastle.

Kendal.—Houses (86) for the T.C.; borough surveyor.

Kenilworth.—Senior school (£15,937); E. Harris & Son.

Kingswinford.—Houses (52), Brockmoor, for the R.D.C.; surveyor.

Kirkintilloch.—Houses (48), Redbrae Road; burgh surveyor.

Lancashire.—Schools, Irlam (£21,000), and Bury (£18,040) for the county E.C.; J. Hartley, Chadderton.

Leeds.—Wesleyan church, Harehills Lane (£5,500); trustees.

Leith (N.B.).—Wesleyan church (£23,000); trustees.

Lichfield (STAFFS.).—Hospital extensions (£25,000); secretary.

Lincolnshire.—School, Stamford (£11,000), for Kesteven E.C.; director of education, Sleaford.

London (BARNES).—Bazaar premises, Cedars estate, for F. W. Woolworth & Co., Ltd.; T. P. Bennett & Son, architects, 41, Bedford Row, W.C. (BATTERSEA).—Reconstruction of 13-7, St. John's Road; Arding & Hobbs, Ltd. (CHARLTON).—Housing scheme, Victoria Road; Greenwich, borough engineer. (CITY OF LONDON).—Road widening, Houndsditch (£80,000); L.C.C. and City Corporation. (EALING).—Houses (170) on various sites; J. Laing & Son, Ltd. Shops and flats (8), Dorchester Road; T. P. Bennett & Son, architects. (FULHAM).—Extensions, All Saint's School, High Street; White & Johnson. (KENTISH TOWN).—Tenements (54), new St. Pancras B.C. estate; A. J. Thomas, architect. (LEWISHAM).—Houses (30), Cliffview Road; T. H. Sawyer & Sons. (STOKE NEWINGTON).—Premises, off Carysfort Road; H. S. Crouchman & Sons. (WESTMINSTER).—Infants' hospital, Vincent Square; Peach & Hall. Extensions to National Portrait Gallery, Orange Street; H.M. Office of Works. Buildings, Wellington Street; W. & E. Hunt.

Luton.—Houses (120) for the T.C.; borough engineer.

Madeley.—Houses (32), with electrical work, for the U.D.C.; Purshouse & Gregory, builders, Sheffield.

Manchester.—Wesleyan church, Chorlton (£6,000); trustees. Wesleyan church, Wilbraham Road (£8,500); trustees.

Monkseaton.—Church, Davidson Avenue; J. Jackson & Sons, contractors, Corporation Street, Newcastle.

Morden (SURREY).—Wesleyan church, St. Helier estate (£16,000); secretary, Tooting Wesleyan Mission.

Much Wenlock (SALOP).—Houses (32) for the T.C.; borough surveyor.

Newcastle-on-Tyne.—Wesleyan church, Elswick (£2,300); trustees. Premises, Percy Street, for the Poor Children's Holiday Association and Rescue Agency; C. Burns Dick & MacKellar, architects, 21, Ellison Place.

Newmilns (AYRSHIRE).—Houses (64) for the T.C.; burgh surveyor.

Northampton.—Sewage works (£180,000); borough engineer.

Northumberland.—Schools, Annitsford (£9,000); Bothal (£1,500); Hexham (£2,000); and Monkseaton (£17,000) for the county E.C.

North Walsham (NORFOLK).—Houses (40) for the U.D.C.; surveyor.

Norwich.—Wesleyan church, Mile Cross (£7,000); trustees.

Ormskirk.—Alterations to Council Offices, Burscough Street; U.D.C. surveyor.

Oswestry.—Houses (25) for the T.C.; borough surveyor.

Oxford.—Houses (160) for the T.C.; Middleton & Co., builders, Bank Street Sidings, Blackpool.

Pershore (WORCS.).—Post office for H.M. Office of Works, King Charles Street, London, S.W.

Rochdale.—Schools, Greenhill and Lower Place; director of education.

Romford.—Houses (50) for the U.D.C.; surveyor.

Ryton (DURHAM).—Houses (100) for the U.D.C.

St. Albans.—Houses (34), London Colney, for the R.D.C.; H. F. Mence, surveyor.

Sandown (I.O.W.).—Houses (30) for the U.D.C.; surveyor.

Seamer (YORKS.).—Methodist church; R. P. Brotton & Son, architects, Chop Gate, Stokesley.

Sheffield.—Church of St. Leonard's, Notwood estate, for the Rev. O. D. Harvey, 235, Abbeyfield Road (£4,000); E. W. Meredith, architect, 18, Greystones Avenue.

Solihull.—Sewage disposal works, Tanworth; R. Dunn, acting surveyor to the R.D.C., Council Offices, Streetbrook Road.

Southampton.—Engineering block, University College; Gutteridge & Gutteridge, architects, 9, Portland Street. Rebuilding business stores, Above Bar, for Tyrrell & Green, Ltd., drapers.

Stafford.—Houses (52), Stone Road estate, for the T.C., borough surveyor.

Stockton-on-Tees.—Wesleyan church, Billingham (£5,000); trustees.

Stoke-on-Trent.—Wesleyan church, Longton (£6,000); trustees.

Sunderland.—Cinema at Grangetown, Ryhope Road; D. Hashman, North Shields.

Swalwell (Co. DURHAM).—Methodist church, Marley Hill; trustees.

Swansea.—Houses (82), Townhill estate; borough architect.

Thornton Heath.—Workshop, offices and showrooms, Thornton Road; C. H. Gibson, Ltd.

Tynemouth.—Development, Preston estate; U. A. Ritson and Sons, Ltd.

Warwickshire.—Elementary school, Tidbury, for the county E.C.

Washington (DURHAM).—Houses (87) for the U.D.C.

Wednesbury.—Alterations and extensions to the Rialto Picture Theatre; Satchwell & Roberts, architects, 6, New Street, Birmingham.

West Riding.—New schools, Adwick-le-Street, Dinnington, and Hatfield; and extensions to Grammar School, Batley (£4,000), for the county E.C.

Whitchurch.—Houses (48), Station Road; U.D.C. surveyor.

Whitehaven.—Schools for St. Mary's Church, Kells, for the Rev. H. M. Caffrey, St. Begh, Coach Road; M. W. C. Mangan, architect, 18, Guildhall Street, Preston.

Withington.—Additions to St. Cuthbert's schools for the Very Rev. Canon Rowntree; W. Gornall & Sons, Ltd., builders, Gore Street, Salford, Manchester.

Wolverhampton.—Re-erection of motor body building factory, Park Lane, Fallings Park, for Holbrook & Taylor, Ltd. (£20,000).

Yarm (YORKS.).—Rebuilding factory for H. & J. C. Hird and Co., Ltd.